An Address
ON
MIND AND MOTIVE:
SOME NOTES ON CRIMINAL LUNACY.

DELIVERED BEFORE THE SECTION OF FORENSIC MEDICINE OF THE SEVENTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

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THERE is no royal road to a knowledge of criminal lunacy. This hydra-headed conjunction of crime and insanity forces itself upon our acquaintance through miserable lives and surroundings, through wretched and disordered phases of mind, through noxious records of jealousy and drink, and of sexual and savage passions, and through manifold experiences taught in reformatories, prisons, and asylums.

It occurred to me that the Forensic Medicine Section of this International Congress might be interested in listening to some notes on criminal lunacy from an old Government official of forty-six years' service: with a record of ten years' medical work in convict prisons, twenty years at Broadmoor Criminal Lunatic Asylum, and sixteen years in his present office as Lord Chancellor's Visitor in Lunacy, work varied during the last twenty-seven years by holding from time to time special inquiries on behalf of the Home Office.

The idea of crime on the one hand and the idea of insanity on the other, each in its way, implies a deviation more or less important from standards of conduct which bear the stamp of social sanction.

What those standards are and what those deviations amount to are the questions which form the basis of any estimate regarding individual members of the community who have committed acts of criminal import. From the estimate thus formed we have the evolution—so far as criminal acts are concerned—of the criminal and the criminal lunatic.

Crime, criminals, and criminal lunatics are subjects which lend themselves to much thought and contemplation, and also to much literary effort and bookmaking; and they are subjects with regard to which it may be said that the less you know the more you can write, especially if you are gifted with an abounding imagination and a metaphysical turn of mind.

However that may be, as big social problems they are subjects which stand out prominently in the range of economical science, domestic politics, and legislative procedure; but taking them to-day, as we are, on the more limited, but still comprehensive, area of criminal psychology, we are to regard them from two principal points of view—the theoretical or speculative and the practical or medico-legal.

THE THEORETICAL OR SPECULATIVE ASPECT.

The theoretical standpoint need not keep us long, as it does not immediately concern us.

Insanity is a mental condition or a neurosis, and its heredity or hereditary transmission is a fact in nature well established and universally accepted.

The heredity of crime, of which we hear so much, is a mythical and dangerous doctrine advanced by those so-called "criminologists" who would have us look upon criminals as poor, hapless creatures foredoomed by nature from birth to eventuate as parasites preying upon society by the perpetration of certain punishable acts. Now, crime, unlike insanity, is neither a mental condition nor a neurosis; it has to be regarded in the main* as an occupation, an employment, or a business taken up as the outcome of environment, education, training, and circumstances, and entered upon as a means of trying to make a living; and the same train of thought may be applied to shoemaking, agricultural labour, and other occupations, where sons succeed fathers, and children parents. It is too much to expect a young thing—an infant or an infant brain—to rise superior to the compulsory education in crime with which criminal parentage and the criminal atmosphere generally smother it. I defy the children of the most intellectual and the most cultured and moral Lord Chancellor or Lord Archbishop not to succumb under similar circumstances.

Besides, the "heredity" idea as to crime takes the heart and the hope out of all philanthropic and legislative measures for the education and proper upbringing of children and youths. Look what has been done by training-ships, and by Barnardo and other homes for waifs and strays! This could never have been done if crime is an inborn and inherent ingredient of any mental life.

Again, we are not concerned to-day with the theorist and faddist doctrine that all who commit murder are insane; nor with that other tenet which one so often hears from people who look upon themselves as specially strong-minded, that tenet—a remedial one of sorts—which would make a clean sweep of all lunatics, ordinary and criminal, by consigning them to the lethal chamber.

THE PRACTICAL OR MEDICO-LEGAL ASPECT.

Coming now to criminal lunacy (involving crime, criminals, and criminal lunatics) in its practical or medico-legal aspect, we find, to start with, that while the criminal tendency or bent in the sane is towards thieving and plunder, the criminal tendency in the insane is towards homicide or personal violence. Thus, of 1,120 criminal lunatics under detention at the end of the year 1911, more than 800 were detained for murder, manslaughter, attempts to murder, and wounding. Of this 800 as many as 478 (nearly five-eighths) had committed murder, the proportion being 289 males and 189 females.

A peculiar interest attaches to the question of insanity when it is raised with regard to a fellow-being who is under trial for a criminal offence, however trivial in character; but when the offence is murder and when a verdict of guilty involves the possibilty of the death penalty the interest to the medical men concerned becomes absorbing and laden with heavy responsibility.

The notes I am submitting here have reference to murder cases only, and are necessarily, with the time at my disposal, somewhat crude and sketchy in character.

The Prevention of Crimes by Lunatics.

Insanity and all the conditions leading up to it are the *bête noire* of the medical practitioner, for in the first place it brings him into contact with the domestic difficulties and troubles of his patients at an inconvenient and disagreeable angle, especially if he has to send the head of the house or any of its members to an asylum; and, secondly, his education and training for his profession have probably been so far neglected, that he has not had the opportunity of dealing practically with the insane. I have always held that no medical man is fully equipped for the practice of his profession unless he has had some months' experience, the more the better, as a medical officer in an asylum. To this lack of experience is no doubt traceable much of the criminal lunacy which is preventable, and which *would be prevented* if certification and if removal to an asylum or to proper care and supervision were not so long delayed. Experience and the resulting capacity for arriving at a proper decision enable the physician more effectively to gauge the mental characteristics of the individual, and also the motives which are most likely to actuate him when deviations from the normal in the direction of insanity thrust themselves prominently into notice.

When the provisions of the Mental Deficiency Bill, now in process of becoming law, come into operation there will be a more ready means of preventing weaklings and mental defectives from qualifying as criminal lunatics by committing murder or other crimes more or less grave. Doctors will then have a less troublesome task in dealing with patients of this class, who are so difficult and impossible at home. The Act will thus have an immense and

* In the Criminal Statistics for the year 1911 it is shown (Table V) that, of 10,646 persons convicted and sentenced, as many as 8,297 were convicted for offences against property, with or without violence, and for forgery and offences against the currency—that is, as many as 77 per cent. were convicted for crimes which had reference to the acquirement of property by larceny and other thievish and fraudulent means; or, in other words, that more than three-fourths of our crime has relation to the means used for earning a livelihood or maintaining a family.

direct beneficial social influence, and will also become a veritable means of effecting a reduction in the number of criminal lunatics. There is, however, undoubtedly a risk of abuse in this matter which will have to be guarded against. That risk is lest unquestionably certifiable lunatics should be shut up in institutions as mere defectives under the operation of the Act. On this account I think it is fortunate for the public that the Commissioners in Lunacy are to be administrators in this somewhat ticklish matter. How they will like it is another question!

I may mention, by the way, that the Board of Lord Chancellor's Visitors are fully cognizant of frequent abuses arising in connexion with a beneficent provision which was made in the Lunacy Act, 1890, Section 116, Subsection 1 (*d*), on behalf of persons who are merely suffering from senility or from such mental infirmity as incapacitates them from looking after their own affairs. Undoubted and certifiable lunatics, often of a troublesome description, are dealt with under this particular subsection of the Act in order to avoid certification. The authorities are thus deprived of the power of dealing with the patient personally, and have to confine themselves to the disbursement of his money. These cases are not under official medical cognizance or supervision, and they are therefore liable to careless management and a retardation of recovery.

Medical Jurisprudence of Insanity.

The broad guiding principles upon which medical opinion has to be based are two in number:

1. *That no lunatic shall be hanged.* This would be an unworthy and repulsive spectacle, repugnant to public feeling—a spectacle to which no Judge of the High Court, however officially dogmatic in rigid application of the "right and wrong" test of insanity, would, as a private gentleman, allow himself to subscribe as a contributing party. In cases where a judge has, on the rigid test or on the failure of the plea on other grounds, to sentence to death a prisoner whom he has some reason to believe to be insane, he has always the opportunity of communicating with the Home Secretary on the subject.

2. *That no mere criminal shall, on the plea of insanity, be allowed to escape the due punishment for his act of murder.* Herein lies the responsibility of the doctor who is giving evidence, expert or otherwise. He is on the horns of a dilemma. If, from lack of experience or want of sufficient careful examination into the mental condition, motives, and circumstances, he fails to trace the insanity which, as a matter of fact, exists, he runs himself against the first principle and contributes to the hanging of a lunatic. If, on the other hand, he declares for insanity from sentiment or on insufficient grounds, or if he fails to see through the prisoner's sham indications of insanity, he runs against the second principle by "standing in" with the criminal impostor and helping him to escape punishment, thereby failing in his duty to the public.

Procedure.

The administration of justice in England in murder cases rests, before and during the trial, with the Treasury, which acts as prosecutors; and after the trial with the Home Office, which has to carry out the sentence of the court, or, if occasion arises, reconsider it, possibly in consultation with the judge.

In the procedure by which a decision is arrived at as to whether a prisoner is or is not a criminal lunatic, there are three stages where the state of his mind may come up for consideration.

1. The jury may be called upon to give their verdict as to his fitness to plead. It is always best, if possible, to let the prisoner stand his trial and plead. This course does away with his after-grievance that he was not allowed to speak on his own behalf. Cases, however, do present themselves where the dementia or the insanity is such as make it futile to place the prisoner in the dock.

2. *The trial itself.* Here the examination of the prisoner before trial by medical men is apt to be handicapped by the fact that the prisoner is not bound to answer truthfully (if he answers at all), apart from any confession he may have made, or in view of his coming plea of not guilty.

3. *The prerogative of mercy* exercised by the Home Secretary on behalf of the King. The Criminal Lunatics Act, 1884, Sec. 2 (1), empowers the holding of a statutory inquiry in the following terms:

> In the case of a prisoner under sentence of death, if it appears to a Secretary of State, either by means of a certificate signed by two members of the Visiting Committee of the prison in which such prisoner is confined, or by any other means that there is reason to believe such prisoner to be insane, the Secretary of State shall appoint two or more legally qualified medical practitioners, and the said medical practitioners shall forthwith examine such prisoner and inquire as to his insanity, and after such examination and inquiry such practitioners shall make a report in writing to the Secretary of State as to the sanity of the prisoner, and they, or the majority of them, may certify in writing that he is insane.

In this regard, the recommendation of the jury, a letter from the judge, or information sent by responsible citizens is duly considered by the Secretary of State.

Medical Examination of the Accused.

I have already referred to the grave responsibility that rests with medical men called in to examine and report, or to give evidence as to the mental condition of a prisoner charged with murder. The range of their examination has to deal with the general mental condition of the prisoner, his mental condition at the time of the murder or alleged murder, the circumstances which led up to the murder, and the circumstances and the mode of the murder itself. Running through the whole area of our inquiry the question of motive or the inciting cause has to be in the forefront; for in some cases strange beliefs and morbid fancies show themselves in the previous life-history of the individual which, although in themselves seemingly remote, *may* afford some clue or explanation as to *why* the murder was committed. After sentence to death, the restrictions which hampered examination before the trial are to some extent removed.

I am anxious to-day to impress upon you not merely the necessity of not being contented with finding mere "indications" of insanity, which may be real, or may be false and assumed for the purpose of deceiving, but also the necessity of leaving nothing out in our scrutiny which would help in getting at the inciting cause, getting at the motive, for the murder. We must continue to ask ourselves, "Why did he do it?" For this is the crux in forming an opinion as to the existence of insanity in criminal, as compared with ordinary, non-criminal cases, it is the *focus* upon which our investigation must be directed and centred. There is, in murder cases, a specific act round which our examination concentrates itself.

Conduct of Medico-Legal Inquiries.

I now propose to deal briefly with some questions and considerations connected with the medico-legal inquiries in murder cases.

Knowledge of Right and Wrong.

This is not a bad rough and ready test for use in a court of law, and the question is one which a medical witness ought to be prepared to answer.

1. If he can say the prisoner did not know right from wrong, let him say so.
2. If he has an opportunity of saying the prisoner knew right from wrong, but that his power of self-control was in abeyance or lost, let him say so.
3. If he believes the prisoner knew right from wrong absolutely, let him say so.

At the trial of James Jefferson, at Leeds, in July, 1908, for murder, the medical witness said, "I think he knew he was doing wrong;" whereupon a juror asked: "If he knew he was doing wrong, but was insane, how then?" Mr. Justice Bingham: "If he knew he was doing wrong it does not matter how insane he was, he is guilty." The jury, after a retirement of an hour and a half, found the prisoner guilty, and he was sentenced to death. The case came before the Court of Criminal Appeal (consisting of Mr. Justice Lawrance, Mr. Justice Ridley and Mr. Justice Darling), and the decision arrived at was as follows (*Times*, July 31st, 1908):

> Mr. Justice Lawrance, in giving judgement, said that there was no doubt that the verdict was unsatisfactory, and in his judgement it ought not to stand. He had read the evidence given by the doctors, and it appeared that there was strong evidence called before the jury, which showed that this man was not in such a state of mind as to make himself responsible

for his act. The verdict being unsatisfactory, he thought they ought to say that the verdict which the jury should have returned was that the man was insane when he committed the act. . . . The verdict would be set aside, and the order would be that the prisoner should be detained during His Majesty's pleasure.

No word in this decision as to "right and wrong" as a test of responsibility. I think it well to mention this case here as showing that in the eye of the law a knowledge of right and wrong is not incompatible with the existence of insanity, carrying with it irresponsibility, in the individual.

Take the case of insane persons—and there are many of them—who commit murder and who at once either go and give themselves up to the police or make their escape, showing that they knew they had done wrong. R. D. murdered his father in Cobham Park many years ago, not from any malicious motive but because the apparent approximation of two stars in the Great Bear was a behest to his deluded mind that he had to do this "to set free the great God Osiris." He escaped at once to France, where he was found wandering and placed in an asylum, whence he was brought back to this country and died in Broadmoor. Again, W. A. N., an insane person, murdered his two children by cutting their throats one morning in Bermondsey. He went straightway to the police-station and told the sergeant on duty what he had done. He was found insane and ordered to be detained during His Majesty's pleasure.

Again, many insane women who commit infanticide know that it is a wrong act; but the judge does not even put his question as to right and wrong to the jury.

Pre-existing Mental Enfeeblement: its Degree and Character.

Mental enfeeblement in some form is a precursor of the insanity which leads up to murder in a large number of cases, and has to be reckoned with in our estimate of the general mental condition of the alleged murderer. Its action is two-fold: on the one hand, it causes failure and disaster in business operations, in industrial occupations, and in the affairs of life generally; and, on the other, it is apt to expand into more serious and more active mental derangement under the pressure of poverty and distress. Over-anxiety, stress, worry, and domestic trouble, especially when combined with some amount of intemperance in drink, form most potent outside factors in the production of criminal insanity.

For our purpose mental enfeeblement may be classed under four heads:

1. *Natural mental defect.* This may be congenital or it may arise from arrested mental development later in life. This is a very large class, and it supplies the "borderland cases" in questions of insanity, and also those cases—those "mental defectives"—for whom the Legislature is at present making provision, as already referred to. Moral obliquity finds a place here.
2. Mental enfeeblement resulting from *idiopathic cerebral lesions*, softening, senility, and the like.
3. Mental enfeeblement resulting from *traumatic cerebral lesions*, from blows and from injuries due to external influences, including sunstroke.
4. Mental enfeeblement associated with neurasthenia, malnutrition, and drink.

In dealing with the various conditions here specified, it must be clearly understood and constantly borne in mind that they do not in themselves either constitute insanity in any form or imply irresponsibility. The individual, in spite of them and of their supposed influence, has to be regarded as sane and responsible and capable of committing acts which are referable to ordinary malicious motives—acts which, in themselves, are of purely criminal import, and therefore punishable. Nevertheless, they are conditions of mind that have to be considered and weighed when we are dealing with homicides whose crime is a matter of life and death, and may or may not be due to insanity.

The Question of Infidelity.

Where the victim is wife, paramour, or sweetheart, the question of infidelity arises in many cases of murder, and it is a question which is by no means always easy of solution; for the belief in the prisoner's mind may be well founded and true in fact, or it may be an absolutely groundless delusion. This is one of the cases in which it is sometimes necessary to have recourse to outside evidence of the police or of neighbours as to domestic relationships, where that has not already been given at the trial. Jealousy, "the green-eyed monster," has much to answer for in these cases.

The circumstances of the case, the personal narrative of the accused, and the opinion we have already arrived at (before the subject of the murder is touched upon) as to the reliability, or otherwise, of his statements, no doubt help us in forming a judgement in a matter where, as frequently happens, a jealous disposition and some indulgence in drink about the time of the murder combine to complicate the situation.

R. G. murdered his child and at the same time threatened to murder his wife, who, he alleged, was unfaithful to him. He was found guilty and sentenced to death. The late Sir Richard Brayn and I examined him at the request of the Home Office, and found that he had delusions, not only about his wife's unfaithfulness, but also that the child whom he murdered was not his. He had other delusions, as well as hallucinations of vision. We reported to the Home Secretary that in our opinion he was insane and irresponsible for his actions at the time he committed the murder, and we certified him to be insane at the time of our statutory inquiry into his mental condition. The death sentence was repealed and the man was sent to Broadmoor.

This case was especially interesting, as the judge who tried him spoke to me afterwards unofficially on the subject, and said he could not understand how we came to report in favour of the insanity of the prisoner, as he had gone closely into all the evidence in the case, and could find nothing to justify him in thinking he was of unsound mind or unaccountable for his actions. (This was before the Act was passed which enables a prisoner and his wife to give evidence.) I pointed out to him that he had all the evidence except that which was most vital, and which my colleague and I had—namely, that of the prisoner himself and that of his wife, upon which we were able to arrive at our decision. Whereupon the judge expressed his agreement with the opinion we had formed and his satisfaction with the ultimate ruling of the Home Office in the case.

Alcoholic Excess.

The medico-legal relations (in murder cases) of (1) delirium tremens, (2) drunkenness to oblivion, and (3) simple drunkenness—three phases of excessive indulgence in alcohol—need only be referred to briefly.

1. *Delirium tremens* is a recognized disease of the brain, in which delusions of a dangerous sort are apt to prevail; and when murder is committed by a person suffering therefrom the jury are not unwilling to record their verdict that the act was that of an insane person.

I. E. was indicted for the murder of his son, aged 3 years, by cutting his throat. After medical evidence of delirium tremens was given, Mr. Justice Charles, in his summing up, said: "Although the mere condition of drunkenness did not excuse the committal of crime, yet drunkenness might bring about a diseased condition of mind which proved an excuse for crime, in so far that such a person was not held responsible in the ordinary way, but was detained during the pleasure of Her Majesty." The jury then found the prisoner guilty, but added that they considered he was of unsound mind when he committed the crime.

In the case of H. H., who, during an attack of delirium tremens, murdered a domestic servant by shooting her, the accused was similarly found insane by the jury—and numerous other cases are recorded.

2. *Drunkenness to oblivion* ("mad drunk" or "blind drunk"), unlike delirium tremens, is not a disease, and cannot be dealt with on that footing. As a condition where some amount of derangement of consciousness and volition leading to crime is brought about by the individual's own act, aggravated drunkenness is not looked upon in courts of law as favouring a verdict of insanity. In murder cases, however, where the death penalty has been recorded, circumstances have occasionally been found such as have justified the Home Secretary in granting a reprieve to penal servitude for life.

3. The part played by *simple drunkenness* with regard to criminal lunacy is a grave one, as it is largely responsible for the fact that many harmless and inoffensive lunatics, or quasi-lunatics, are converted into criminal lunatics. In homicidal cases where this takes place

drink is the last straw in determining that nothing short of murder will, to the lunatic's mind, meet the revengeful demands of the over-heated brain. It would never do to let mere drunkenness weigh, as insanity does, in relieving a murderer of his responsibility for the homicidal act. The case of H. T. in this relation is an interesting one. This man was sentenced to death and ultimately hanged for the murder of his wife, about whose fidelity he had doubts. Dr. Brayn and I held a medical inquiry into the state of his mind after he was sentenced. We found no insanity, but he told us that on the day of the murder he took a half-holiday and primed himself to excess with drink, to give him courage to carry out his intention of killing his wife.

Epilepsy.

Epilepsy has a weird and somewhat anomalous association with criminal lunacy and a real and important significance in homicidal cases. Genuine epilepsy may occur with sane states or with insane states of mind. In either case, in connexion with the fits, homicidal acts may be committed during unconsciousness and with complete obliviousness afterwards. But these acts are not complicated acts, nor, so far as my experience goes, premeditated or murderous in intent; and the motive will be searched for in vain, although in some cases some amount of association of idea with thoughts occurring during the pre-epileptic stage is discoverable.

The well-known Broadmoor case of E. C. is an interesting one. Mrs. C. while dressing her infant went to cut some bread for another child. She had an epileptic seizure, and, instead of cutting the bread, severed her infant's arm at the wrist. She had no consciousness of the act, and she told me at Broadmoor that she had no recollection whatever of what she had done.

Another case, that of H. J., is referred to by Dr. Baker, the Superintendent of Broadmoor, in an instructive analytical paper on epilepsy and crime in the *Journal of Mental Science* (April, 1901). H. J. was the subject of epilepsy after head injury, intensified by habits of intemperance. He went to a slaughterhouse with the object of interviewing a man concerning the killing of a pig. On returning home he beckoned his little girl, who was sitting on the doorstep, into the house, and he had no recollection of anything happening until a few minutes afterwards he discovered the child lying across his knees with her throat cut.

In the case of William G., a man well known to be epileptic, the death sentence was recorded, and Dr. Brayn and I were able to report to the Home Secretary that his act of putting his child on the fire, resulting in death, was committed while he was in an epileptic condition supervening upon alcoholic intoxication, and that at the time he was not conscious of what he was doing. Nor did he afterwards remember anything about having done it. He was reprieved.

Delusions.

Genuine delusions of one sort or another, with or without hallucination, in an insane person charged with murder constitute the most frequent inciting cause of the homicidal act, and they are not difficult to detect in ordinary straightforward cases. The prisoner is only too willing, for the most part, to narrate the circumstances, to explain his grievances, and to justify his conduct if he believes himself to be the victim of conspiracy or persecution.

Speaking generally, they are mostly divisible into two classes: (*a*) delusions in conditions of mental exaltation or mania, and (*b*) delusions in conditions of mental depression or melancholia.

(*a*) Delusions in conditions of mental exaltation and excitement are chiefly exemplified in cases where one man kills another man, the incitement to murder being usually a delusion, or delusions, of persecution, suspicion, or of aggravated personal injury or annoyance in some form.

W. C. M., an American gentleman, of temperate habits and of great intelligence, murdered a complete stranger under somewhat unusual circumstances. He was the subject of very strong and active delusions to the effect that he was one of the many victims of a widespread criminal conspiracy which pervaded all ranks in society. One night, towards the early morning, he imagined he heard a man outside the door of his room—"one of the devils." With a pistol in hand he followed, as he believed, the man downstairs and out at the front door, where he saw, on the opposite side of the street, the man Merritt going to his work at a brewery in Lambeth. Mr. M. went across and deliberately shot him, regarding him as one of the gang of conspirators, and then went and gave himself up to the police. At the trial there was abundant evidence of insanity in the case; and his brother said prisoner had sustained a sunstroke and had been confined in an asylum in America. His delusions, curiously enough, prevailed most actively during the night and scarcely ever showed themselves during the day. The police produced a letter which prisoner had written to them the month before the murder, and in it he said, "My life may be taken any night; I trust your agents are not to be bought over as the American police are." The Lord Chief Justice (Bovill), in his summing up said, "There is evidence here that the mind is unsound, and if the evidence satisfies you that the prisoner at the time he committed the act was not in a state to distinguish right from wrong, and was *not capable of controlling his actions* (the italics are mine) then he would not be responsible for the act he committed and you would find a verdict of not guilty on the ground of insanity." The jury returned a verdict in those terms, and the prisoner was placed in Broadmoor, where his delusions continued very active, and led years afterwards to his mutilating his own person rather than yield to the uncleanly demands which the "conspirators" made upon him.

The following is a case of delusion of another description:

J. H., a labourer, murdered an old woman under the superstitious delusion that she was an old witch who had "looked upon" him and tormented him day and night and injured his health; and he justified his act by quoting texts of Scripture, and especially one in Leviticus where it says, "A man also or woman that hath a familiar spirit, or that is a wizard shall surely be put to death," etc. The farmer who captured him gave evidence that prisoner said there were fifteen or sixteen damned witches in the parish; he had killed one and he would kill the rest. The Governor of the prison stated that prisoner never appeared to think he had acted against the law in killing the woman, and that he seemed to think he had merely done his duty because she was a witch. The judge in his summing up said (and I think rightly) that he doubted very much whether there was in this case much of the impulse spoken to by the medical gentlemen; and that from the way in which the prisoner had spoken of the witches and of his intention he thought it was much more a case of intention. After a few minutes' deliberation the jury returned a verdict of "not guilty on the ground of insanity."

A drinking bout is no doubt a frequent cause of the culminating incitement to murder in these cases of delusion when the pre-existing exaltation reveals no such pronounced indications as would in themselves lead us to anticipate the homicidal act. In other, non-drink, cases there may be no marked behaviour of an excited or noticeable sort; but the delusive idea may be carried out under a quiet, steady fixed determination.

"*Homicidal mania*" and "*homicidal impulse*" are unsatisfactory and for the most part unjustifiable phrases or terms made use of when a prisoner, who has undoubtedly committed the murder, is uncommunicative as to details or says he has no recollection whatever of the circumstances or of the act, giving and leaving the impression that at any rate there was no motive, even if he was guilty. In these cases, with few exceptions I should say, prolonged examination or prolonged observation, where the case is a genuine one, has revealed the existence of delusions or other indications of the insanity of which the murder was the outcome. In cases of this sort it was by no means an unusual experience among inmates of Broadmoor to find that the individual had struggled with himself for weeks or months against committing the act which he ultimately did commit under the overpowering influence of definite and well-marked delusion.

(*b*) Delusions in conditions of mental depression, where, in women for the most part, there is an insanely exaggerated extension of religiousness and foreboding, accompanied by an overpowering sense of personal unworthiness and unfitness to live. In a mother the resulting actively suicidal ideas are apt to become associated with a strong morbid feeling that it is her bounden duty to her child not to leave it behind her to live the horrible life as pictured by her anguished mind; or it may be that she imagines she hears the voice of God telling her that it is her duty. In any case she takes the child's life, and in so doing it often happens that her death-dealing hand is stayed from carrying out the intended suicide.

The great frequency with which these infanticides occur is illustrated by the fact that of 181 female homicides who were detained in Broadmoor during the year 1911, as many as 154 had taken the lives of their own child or children; and it is evident that

a somewhat similar condition of mind is not uncommon in men, as 54 men had murdered their own child or children out of the 303 men so detained for murder.

Murder under these circumstances—that is, where an atmosphere of melancholy and foreboding becomes accentuated into an overpowering and insane sense of dejection and self-recrimination—more often than not occurs in the morning; while the opposite condition, revengeful suspiciousness and insane aggressiveness and excitement, involving captious self-assertion, possibly under the influence of drink (exaltation), is more likely to lead to murder late in the day or after midnight hours.

The occasional *morning* evanescent wave of gloomy dejection, and the occasional ultra-roseate and absurdly sanguine *evening* point of view are phases of self-introspective experience not unfamiliar to our normal selves. If either of these phases were to last indefinitely and persistently, we would in time become unfit for our work, and goodness knows what might happen.

Obliviousness of the Act.

A profession of obliviousness of the act (amnesia, forgetfulness, loss of memory) is often had recourse to as an expedient by prisoners in cases of murder, but it is an indication fraught with the gravest suspicion, and medical men ought to place no reliance upon it as a sole indication that the case is one of epilepsy or insanity. The prisoner usually in time, and when it suits him, is able to give a detailed account of the circumstances. Single and simple automatic acts are often completely forgotten in drink or epilepsy, but I am bound to say that in all my experience I have never been able to satisfy myself in any case of drink or insanity where murder has been committed that the recollection of a series of purposive and exceptional acts extending over a number of hours, and involving preparations for the murder and including all the circumstances of the act itself, has been absolutely and completely obliterated from the memory. Confusion and incompleteness of memory regarding some portion or portions of the circumstances connected with the act may certainly occur, but that is a totally different matter.

B. W., a soldier, was under sentence of death and afterwards hanged at Chelmsford for the brutal murder of the woman he was keeping company with. Dr. Brayn and I held a statutory inquiry by direction of the Home Secretary. At the commencement of our interview the prisoner assumed an aspect of stupidity and of incapability to understand our questions on the most ordinary matter of everyday life, and his replies were disjointed, calculated, and evasive. Later on, however, he gave up this attitude and talked more to the purpose on subjects that had no connexion with the murder itself. He told us about meeting and walking with the deceased on the evening of the murder. As we approached the circumstances leading up to the murder he completely "dried up," and indignantly and persistently denied having murdered her, avowing that he had no recollection whatever of the allegations made against him. We told him that the judge and jury were satisfied of his guilt, and that he had better think it over during the night and tell us about it in the morning. He, however, left us with an offended air, saying his word had never been disbelieved before. In the morning, after we spoke to him of the seriousness of his position, he broke down and told us in detail how he carried out the murder.

H. W., a drink case without insanity but with assumed obliviousness. This was a very bad and complicated murder where, having, against my own convictions, been persuaded by the prisoner that he had no recollection of the murder or the circumstances connected with it, I gave evidence to that effect at the trial, saying that although much under the influence of drink he was not insane. He was found guilty on abundant evidence and sentenced to death. Being anything but satisfied on the obliviousness in the case, I obtained permission from the Home Office to have another interview with the prisoner. I reasoned with him for a long time, and it was not till I caught him tripping that he gave way and told me the whole details of the murder in every particular, working himself up into a state of great excitement.

Feigned Insanity.

Malingering, imposture, and feigned insanity have to be guarded against, as they are sure to be "tried on" in many cases. They require tactful dealing when suspicion arises. As a rule the prisoner overacts the part and gives himself away.

Medical men should not be too ready to see insanity and give the prisoner the benefit of the doubt, merely because they feel that protracted examination may prove useless. The impostor not infrequently excites suspicion by a bad habit of repeating the words of the question put to him in order that he may have time to think what is the best kind of answer to give. Besides this, there are many little things in the manner of the prisoner and his mode of response that contribute to detection.

A. B. was convicted and afterwards hanged for the murder of a woman with whom he had cohabited for years. A plea of insanity was set up, and the superintendent of the asylum and the medical officer of the prison gave evidence that he was insane. He was, however, sentenced to death. Dr. Brayn and I held an inquiry, and found that the indications of paralysis and imbecility were feigned. We reported to the Home Office that he was an impostor. The medical officer of the prison said he certified insanity because the asylum superintendent had done so and because he "hated these hanging jobs."

A Family History of Insanity.

A family history of insanity (often of the flimsiest sort), which is often advanced by well-meaning relatives and doctors, cannot be regarded as being of value in helping us to ascertain the prisoner's condition of mind at the time of the murder or his motive or object in committing it. If we first find the man to be insane, such a family history may come as corroborative and be useful later on in dealing with him.

Alleged Predisposing Causes.

Anomalous predisposing causes are also urged as evidence of mental derangement. Convulsions (fits) when teething, blows on the head and injuries when at school, severe effects of scarlet fever, measles, etc., are seldom any helpful guide to us in medico-legal cases. When a prisoner has advanced to manhood or middle life, has married and taken up positions of responsibility, childhood troubles rarely weigh for much.

Multiple Crimes.

Multiple murders and murder with attempted suicide must each be taken on their merits, different values *qua* insanity being given according to the circumstances of the case and the mental condition of the prisoner, and the motive where found.

Provocation and Premeditation.

Provocation and premeditation are points that have to be considered in any complete statement of the circumstances under which a murder has been committed.

MALINGERING.*

BY

SIR JOHN COLLIE, M.D., J.P.

THE question of feigning or exaggerating illness has of late attracted considerable attention in this country, but it is a mistake to suppose that the condition is of recent origin. Those who have to advise insurance companies know that exaggerated and fraudulent claims are, at any rate, as old as the accident laws. The reason for the prominence the matter has now attained is that many of the approved societies under the National Insurance Act have taken fright and become obsessed with the idea that excessive sickness claims from this cause must inevitably lead to serious financial embarrassment. On the other hand, there are those who emphatically deny any tendency on the part of the working classes to exaggerate or feign disease. It obviously would be unscientific to attempt to form any estimate of what the triennial valuation will disclose based merely upon the results of three or six months' working of the Act; therefore no one knows, or indeed can know, which view is correct until sufficient statistics are available. However, it may be safely assumed, judging from the experience of the Workmen's Compensation and Employers' Liability Acts, that it will be necessary to take special precautions for the prevention of malingering when dealing with thirteen millions of insured people, nearly half of whom, prior to the passing of the National Insurance Act, had not in any way been insured against sickness.

To most medical men the simulation of disease presents a difficult, almost insoluble, puzzle, for in ordinary medical practice such cases seldom occur; but those who have the

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administration of the Insurance Act must ever keep an open eye for the possibilities of fraud or quasi-fraud.

A malingerer has been defined as "one who feigns sickness, or who (deliberately, knowingly, and wilfully) induces or protracts an illness with the object of avoiding duty, claiming money compensation, exciting sympathy, or from any other reason." Now the out-and-out malingerer who fills this definition is as rare as he is interesting, and *his* unmasking should not be very difficult. The process of accumulating data to expose fraudulent cases often resolves itself into a battle of wits between the medical examiner and the so-called patient. Fortunately, in most cases it is a contest between knowledge and ignorance, and in such matters the ignorant are very heavily handicapped. Examinations in these cases, apart from the routine investigation of the various systems, can follow no set rules; the method of meeting the various difficulties as they arise are only learnt by long and sometimes bitter experience; difficulties are met at almost every turn for which academic training gives little preparation. Effective assistance can frequently be obtained by simple means such as the following case illustrates:

A woman was condemned by a house-surgeon to wear for many weeks a back splint for an alleged stiff right knee. I removed the splint, and directed her to sit down and take off her right boot; meanwhile, I eagerly plied her with questions as to what exactly happened at the moment of the accident—whether the company's servants had been becomingly polite, what she said, what they said, and so forth—all of which was no business of mine. It was intensely interesting to her, however. She forgot the present and lived in the past, removing her boot in the usual way as she spoke—that is, she crossed her legs and bent her knee!

Straws show how the wind blows. On two separate occasions, after examining plaintiffs, with the medical assessor before the judge in his private room in the course of a trial, I have given the necessary turn in favour of the defendant by pointing out that whilst the man declared he had a limp, the soles of his shoes were equally worn.

Few as the cases of absolute malingering may be, if they escape detection for any length of time they have a material bearing upon any fund from which they may be drawing. I will venture to quote a case where quite minor injuries resulted in the payment of a large sum of money.

A workman bruised his leg and dislocated his thumb whilst at work, for which he received prompt treatment. His employer's doctor nine months later, and on several subsequent occasions, certified that there were no objective signs of injury to his leg and that he voluntarily kept his thumb stiff. The man continued to receive compensation for seven and a quarter years, at the end of which period I saw him. He complained of stiffness and continuous pain in his leg, and brought with him his son, who he insisted should valet him as if he were helpless. Prolonged and exhaustive examination revealed no reason for incapacity. He made many attempts to frustrate my examination, keeping his leg stiff, and describing the necessary manipulation as "inhuman." Although he complained of intense and continuous pain on attempting to move his thumb, there was no muscular wasting such as would have occurred had his complaint been genuine. *X*-ray photographs confirmed my diagnosis that he was a rank impostor.

His employer having learnt that he frequented certain swimming baths had him watched, with the result that he was seen swimming and diving, and dressing and undressing himself.

On my advice the employer stopped payment, the case was taken to court, and the judge, who was assisted by a medical referee, made an award terminating the weekly payments from the date of my examination. From the date of the accident to the time of the decision he had received sick pay amounting to some £290.

I may remark that it was the aggressive and ostentatious way in which this man asserted his complete inability to undress and dress himself that first aroused my suspicions.

I have given much attention to the question as to why it is that so many of the working classes can be accused of not acting fairly by their fellows, in that they either feign sickness or, after a genuine illness, linger on the threshold of work. The vast majority of those who give the impression of shamming, and are classed as malingerers, are people who, although they have to work, are of poor physique, and their standard of health is, at best, far beneath the normal. This is especially so with women. It is interesting to note that in the outcry as to the unexpected demands upon the sickness funds much has been attributed to female workers, of whom four millions are compulsorily insured. Those who thoughtlessly assert that malingering is rampant, and mainly confined to women, have lost sight of the necessity of having ample data before right conclusions can be drawn; and also of the fact that as the same results often proceed from different causes, there is therefore a liability to attribute a result to the wrong cause. Before the passing of the National Insurance Act there were thousands of women, many of them badly underpaid, constantly employed in the hard grind of daily toil, who were wholly unfit, and the passing of the Act was their emancipation, because it will ultimately entail their drawing permanently on the sickness benefit fiund. It should also be borne in mind that low wages conduce to frequent sickness. A large number of women wage-earners do not earn enough to keep them in health. The Board of Trade returns show that 10s. to 15s. a week is about the average in the lace, hosiery, woollen, cotton-winding, and silk-weaving trades. Whether the societies to which these women belong were wise in admitting them does not now concern us, but who will blame these underfed, ailing, dispirited toilers if they claim the sickness benefit to which they have a right under the Act, and for which they have been compelled to make contributions?

It is also no secret that in the competition between approved societies large numbers of weakly males who ought to have been post-office contributors were eagerly sought after and enrolled.

It often happens that, in addition to the payments under the National Insurance Act, a man is in receipt of weekly allowances from one or more clubs, and the total amount of his income when he is on the sick list is actually *more* than when he is working.

An infinitely larger class than the out-and-out malingerer will be found to consist of those who are by no means intentionally dishonest, but who nevertheless remain long on the sick list as a result of an introspection which savours of cowardice, a bad heredity, or a pessimistic temperament. Of these not a few come perilously near to fraud. It is in the proper supervision of this class that millions of pounds can be saved per annum by a strong, resolute, and conscientious stand on the part of medical men. In a large number of cases introspection and subjective sensations are unwittingly fostered, and a condition is brought about which is of psychogenic origin, and does not rest upon the physical disability itself, but upon the *idea* of the disability, which in its turn is dependent upon the personal equation and the personality of those who are associated with the patient. To many the temptation of obtaining week by week money which has not been worked for is irresistible; unearned increment has a fatal fascination for all classes. The idea that they are entitled to have, as they say, "some of their own back" when, as too often happens, the disability from which they are suffering is a comparatively trifling one, will be found to account for a certain proportion of the illicit demands made on sick funds by those whose complaints are begotten not of disease but of covetousness.

The problem frequently presents itself for solution: Is the patient a wilful malingerer, or the victim of the psychical conditions consequent upon an accident or illness?

Psychologists tell us that we conceive only that partial aspect of a thing which the individual regards, for *his* purpose, as its essential aspect. What is considered essential varies, of course, with the point of view of the individual. For instance, a piece of chalk is looked upon by different people according to the use to which it is put: The geologist thinks of it as the cemetery of millions of animalculae; the schoolmaster as a messy but useful aid to imparting knowledge; the chemist, as a carbonate of calcium. In short, the essential quality of a thing is its worth to the individual, and its value to him is its power to serve his private ends.

It must be remembered that sick and injured workmen belong to a class whose education is incomplete, and that they are peculiarly unfit to take a detached view of themselves, especially when ill. Too often the essential aspect of their case is the value unconsciously put upon their abnormal sensations in so far as they influence the continuance of sick pay.

If an introspective, self-centred workman is unfortunate

enough to find himself entitled, when sick, to the material advantages before mentioned, he is much to be pitied; for he is subject to temptation that many, even in a class whose antecedents and traditions are not his, succumb to. It is impossible for him to think impartially.

Many working men of fair education, who in ordinary matters can reason quite logically, and whose mental equilibrium is properly balanced, seem to be congenitally incapable of appreciating ordinary moral obligations when it rests with them to decide whether they shall or shall not return to work. Much would be gained if the working classes could be brought to appreciate that self-respect, self-control, and a return to work when able are of more service and more lasting value than a continuance of doles from a State-aided fund.

Some are pseudo-neurasthenics for medico-legal purposes; others are hysterics with not a little guile. Many are professional valetudinarians, and how far they differ from real malingerers is an ethical point of great subtlety. As a rule, they have a small mental banking account, little sense of responsibility, very little idea of the proportion of things, and are quite ignorant of the fact that the only true happiness lies in work.

This class is likely to be a diminishing one, for time works wonders in teaching even ignorant people to view things in their proper perspective.

Another class who may well be dealt with in this category are those nervous people who are generally given to self-examination, and unconsciously foster subjective sensations which their stronger and better balanced neighbours would ignore. The idea of an illness or an injury obsesses them. Their pains are real, but often only psychic. Such people are victimized by their unstable nervous systems, and too often they make no stand against introspection.

We know that cerebral tissue holds the master key of all the functions. Who would deny that mental anxiety and worry tend to leanness?

The impressions which are written on the brain cells by some physical or chemical process, of the exact nature of which we are ignorant, are stored by the million in the cortical tissue of the brain. Our ideas and impressions come to us from without. Intuition, I believe, plays but a small part in our mental processes, and outside influences and associations determine what we are and what we shall be. Normally when we reproduce impressions they are by no means as vivid as they were originally, but some brains can produce an impression so as to almost visualize it. This has an important bearing upon the mental attitude in the class of case I now propose to consider. Our mental processes are such a conglomeration of subconscious operations and conscious thinking, that it is difficult to understand exactly what foreruns conduct, otherwise it would not be difficult to understand the psychology of the fraudulent mind. At any rate we are fully cognizant that groups of thought run along the line of least resistance, and that every repetition makes the trodden path more passable. That these become to some extent automatic, and are reproduced with but a trifling stimulus, is well illustrated by the story told of the veteran who, upon a wag suddenly shouting in a stentorian voice, "Attention," was promptly brought to a standstill with his hands in the orthodox position, forgetful of the fact that he had been carrying with both hands his dinner rations which had just been served out to him.

All our minds are to a large extent suggestible, and in many cases the best chance of restoration to a life of usefulness is to obtain a readjustment of the master sentiment, and thus redirect the mind's activity.

Whether we slavishly follow suggestions made, or resist them, depends very largely upon whether our volition is strong or weak. That we are all largely dependent upon suggestion for our conduct will, I think, be admitted.

In too many cases a desire to live a life of idleness induces men of the working classes to conjure up memory pictures so persistently that the repetition becomes a habit. People of this class have little innate power of inductive reasoning, and by the mere process of repeated thought unconsciously educate themselves. Sympathy feeds the flame, and contemplated legal procedure engraves deeper and deeper on the brain cells what *should* be the phantom memory picture of an accident, the real physical disabilities of which have long since disappeared.

Too often the pains and aches, the loss of sensibility, and the nocturnal neuralgias are but the echoes of a former injury; they have no pathological entity, and are but functional in nature.

It is a mistake to suppose that the inhibition of the higher controlling centres, the loss of self-control, and the habit of visualizing memory pictures of past painful sensations is found exclusively in the highly strung and delicately nurtured. My experience is that the stolid, respectable working man, when taken out of his normal somewhat humdrum existence and placed in a suitable environment, is quite as likely to react to his surroundings and, as a result, ultimately succumb to the temptations of the pettifogging lawyer. In the event of an accident to such a man, if he receives for several weeks in a large public institution the kindly ministrations of a skilled doctor and trained nursing staff, and finds himself the object of much sympathy and many anxious inquiries by genuinely distressed relatives, he is in an exaggerated state of impressionability, and therefore becomes an easy prey to the suggestion of the rascally solicitor's touts, who so frequently, by various devices, obtain an entrance to the hospitals.

The receptive capacity of many people depends upon the quality of the dogmatic assertion of those who are endeavouring to make an impression on them. The broken-down members of the legal profession may be trusted in their capacity of sham legal advisers so to dogmatize that they insidiously teach the commercial value of an accident and of the supposed benefit accruing from the unearned increment. Fortunately, psychotherapeutics is now taking a prominent position in scientific medicine, and the susceptibility to external impressions to which I have just referred is taken advantage of in the modern method of treatment which is adopted for the cure of such cases. This is the golden thread which runs through the illuminating argument of Dubois's work on psychic treatment of nervous diseases. The mental effect of suggestion as a curative agent, combined, as it now is, with the detachment of the patient from the sympathetic environment of injudicious friends, and the scientific study of the mental processes of his case, is the method now adopted by all scientific physicians in Europe, and can be seen in daily practice in all our hospitals where functional nerve disease is treated.

The masterly way in which patients are seductively led from their morbid mentality and made to view themselves and their surroundings in a proper perspective has always called forth my admiration.

The treatment is necessarily institutional; it consists for the most part in complete isolation from relatives, absolute rest in bed, abundance of good nutritious food, massage, electric baths, and bright and tactful nursing. The curative effect is marvellous. As a rule, severe cases take several months, but I have had many cases where a comparatively short residence in the hospital has been successful. The result in the majority of cases can be confidently counted on.

Occasionally—rarely indeed—a sudden cure is effected in this class of case, but the fact that sudden cures *do* occur goes a long way to prove that the pathology is of a psychic and not a physical character.

To a layman a paralysed limb implies organic disease, and it is with the greatest difficulty that one can convince the non-medical mind that functional disease connotes no destruction of nervous tissue, but is merely a local manifestation of a functional inactivity of the brain cortex.

The following story illustrates my point:

Some years ago a lad of about 15 was admitted to one of the large London hospitals suffering from contraction of his hamstrings, which he had had for two years. He sat in bed all day, and slept all night with his knees drawn up, and was apparently unable to straighten them. On several occasions he was given an anaesthetic, and the joints at once relaxed, but immediately contracted again on his recovering consciousness. At 4 o'clock one morning the house-surgeon was urgently summoned to see the patient who occupied the bed next to the boy's. He had been seized by an acute attack of mania, and was wildly gesticulating with a knife. Several nurses were attempting to restrain him, and others were engaged in securing the knife. Another patient was in an epileptic fit from sheer fright, and the boy with the useless knee-joints had suddenly jumped out of bed and run downstairs! The interesting point is that the boy was made to live up to it, and was permanently cured.

The fright, the abrupt introduction into a totally new environment, the horror of the situation, suddenly brought into activity the set of cells whose duty it was to originate or inhibit nerve activity, but whose latent potentialities could not be called into action without a powerful stimulus.

We have seen that in addition to the malingerer who can properly be so designated there are several classes which are either on the border-line or, but for careful discrimination, would be so placed. The general practitioner will now find himself frequently confronted with the complex problem of classifying such cases.

When a case is confidently diagnosed as malingering the treatment is simple, it cannot be too drastic. It may be that in the fullness of time the underfed and overworked class will disappear; until that happy day arrives the medical man will still have many difficulties in dealing with this problem. Those who are on the borderland of fraud require an appreciation of their position, and a possible indication that in the velvet glove there is an iron hand. Far more difficult is it to deal with the introspective, imaginative, and pessimistic class, but the exercise of that moral stimulus which medical men possess can work wonders.

It is a mistake to think that all malingering is the outcome of deliberate wickedness. Because a man does not return to work as soon as one thinks he ought, it is harsh to assume that he is a shammer and should be branded as a wilful malingerer. Such a view is not only unjust, but demonstrates a poor knowledge of human nature. Great allowance has to be made for the personal equation. Moral responsibility, even amongst the highly educated, is a variable quantity; indeed, it almost varies as much with different individuals as do the features. We cannot always fully appreciate the mental processes taking place in each individual mind, and so long as unregenerate human nature is being dealt with, so long are we bound to weigh all the circumstances of each case, if we wish to be fair. The mental attitude of workmen with regard to recovery after sickness is a very complicated one, and it is only by studying and fully understanding it that one can successfully deal with such cases.

THE SCIENCE COMMITTEE
OF THE
British Medical Association.

REPORT ON URINARY ANTISEPTICS.*

BY
ANSON JORDAN, M.D., F.R.C.S.

INTRODUCTION.

URINARY antiseptics are drugs given by the mouth with a view to disinfecting the urine and the urinary tract. They form an important class of drugs, and one to which a new and most valuable group (urotropin and its derivatives) has been added within recent years. In the case of these drugs we are not concerned with obscure actions upon diseased tissues or a disordered metabolism, but with the simple fact of the production of antiseptic substances in the urine. Consequently it is obvious that a great deal of valuable information as to their mode of action and relative efficiency may be obtained by purely experimental laboratory work.

By growing bacteria in the urine of a person taking the different drugs they may be standardized and compared in the same way as any other antiseptics, while by varying the acidity and alkalinity of the urine information as to the effect of this most important factor upon the action of the drugs may be obtained, and it was upon these lines that the work to be described was undertaken.

One method of estimating the antiseptic power of the urine after taking these drugs would be to add it to cultures of the organisms, but another, which is far preferable since it closely imitates the actual conditions, is to grow the organisms in the urine itself, comparing their behaviour in urine after taking the drugs to that in normal urine. It was this latter method which I adopted. It necessitated a preliminary investigation upon the growth of the bacteria used in normal urine, and the effect of acidity and alkalinity upon that growth and the results of this will be first recounted.

The organisms I selected for the experiments were the *B. coli* and the *Staphylococcus pyogenes aureus*. They were grown in the urine in pure culture, and were chosen as representing two common types of organism present in urinary infections. It is, unfortunately, impossible to work with either the tubercle bacillus or the gonococcus owing to the uncertainty of cultivating them.

In addition, in each case I investigated the "putrefaction" of the urine when simply incubated in unsterilized vessels—since this "putrefaction"—the result of infection with mixed non-pathogenic organisms of all kinds—is the condition which is present usually in the common cases of cystitis due to infection of residual urine in patients leading a catheter life, and is probably more practically important in this connexion than the cases of "pure" infections of the urine.

The drugs I have investigated are as follows:

1. Hexamethylenetetramine and its derivatives (urotropin, helmitol, etc.).
2. Sandalwood oil.
3. Salicylic and benzoic acids.
4. Boric acid.
5. Uva ursi and arbutin.

METHODS.

I made use of my own urine for the experiments. It was tested before and after the work, and found to be normal to the ordinary clinical tests—that is, as to reaction, specific gravity, and absence of albumin, sugar, and deposits. The diet, exercise, and mode of life were kept as far as possible constant at the time, so that the results are strictly comparable. The complete twenty-four hours' specimen was collected from morning to morning, and samples of that of the previous twenty-four hours used in each day's work. In the determination of acidity it was found convenient to take as an arbitrary standard a "degree of acidity," which may be defined as the amount of acid in 10 c.cm. of a urine of specific gravity 1020, which will exactly neutralize 1 c.cm. of decinormal soda, using phenolphthalein as the indicator. The urine was diluted ten times with distilled water to make the colour less obvious. The first definite change of tint was taken as the end point. The degree of acidity is then found by taking the amount in cubic centimetres of decinormal soda required for 10 c.cm. of the given urine, and dividing it by the number, beyond 1,000, in the specific gravity of the specimen, and multiplying by 20. Thus urines of different specific gravities are reduced to a common level. For example, suppose a urine of specific gravity 1015 required 2.8 c.cm. of decinormal soda, then the acidity is $2.8 \times \frac{20}{15}$. By this means, as was pointed out by Joulie, the acidity is given in terms of the total solids, and not of the bulk of fluid.

I am of course aware that this direct titration of alkali does not give the true acidity of such a mixture of acid salts as the urine, nor the amount of any one acid constituent, but it is the only simple and accurate method of determining the urinary acidity, and it gives reliable comparative results. In alkaline urine the degree of alkalinity was found by adding excess standard acid and titrating as above.

The acidity and alkalinity was varied by taking acid sodium phosphate or potassium citrate respectively by the mouth. In certain experiments with sandalwood oil and with salicylic acid the acidity was increased or diminished by adding directly to the urine known amounts of NaH_2PO_4 or Na_2HCO_3. By this method specimens of different acidities can be obtained more readily than by the more laborious method of taking each drug by the mouth and sterilizing each specimen of urine; and, moreover, it was found experimentally that this method was satisfactory—that is, the same results were obtained as if the drug had been taken by the mouth.

The various drugs were taken by the mouth for periods of three to five days, and specimens of urine were not tested until the drug had been taken for at least twenty-four hours. In those experiments dealing with putrefaction the urine was incubated in chemically clean but

*A portion of the work here described was done under a grant from the British Medical Association.

unsterilized tubes at body temperature, and thus allowed to putrefy. In experiments with other organisms in pure culture, it was necessary to obtain sterile urine and to infect it with the organism in question. Boiling might alter the composition of the urine, and so is inadmissible; and it is impossible to obtain sterile urine with any degree of certainty by the method of cleansing the meatus, etc., and passing into sterile vessels, so it was sterilized by passing through a Pasteur-Chamberland filter fitted with an arrangement for collecting large quantities.

THE EFFECT OF VARIATIONS IN THE ACIDITY ALONE.

A number of experiments were made in which the different organisms were grown in urines of varying acidity and alkalinity. Measured by the standard already given, it was found that the average acidity of the twenty-four hours' specimens of urine over a period of five weeks was 3.9, the extreme variations being between 3 and 5; the average of the morning specimens being 4.3 and the extreme variations from 3 to 5.5. By taking reasonable doses of acid sodium phosphate the acidity was raised to 8.9, while with potassium citrate the urine was readily made alkaline to the extent of 2.5 degrees. The results are shown in detail graphically in the accompanying curve (Fig. 1). The results correspond closely to those of Hutchison, and subsequent investigations in a large

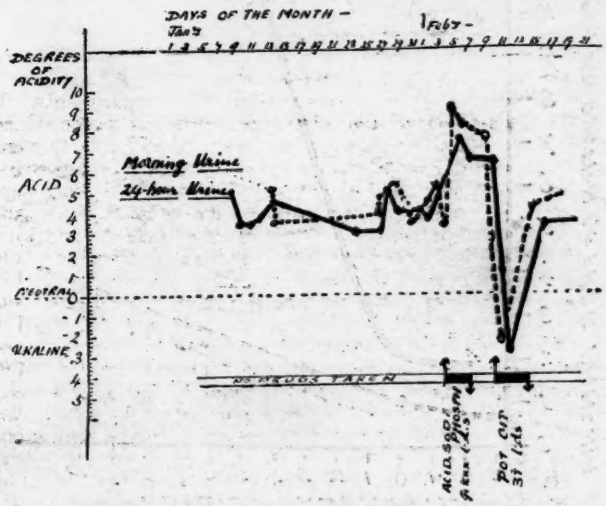

Fig. 1.—The variations in the normal urinary acidity and the effect of drugs in altering it.

number of different individuals show that these are about the average figures, and the variation is not large.

When a urine of average acidity is allowed to putrefy in the manner described above, it becomes alkaline in twenty-four hours, and is giving off free ammonia in two to three days. Urine which is alkaline when passed putrefies rapidly, while the putrefaction of urine of high acidity is considerably delayed.

A number of experiments were made with a view to determining the effect of the degree of acidity upon putrefaction.

EXPERIMENT 1.—*Specimens of Urine Incubated at Body Temperature.*

(*a*) Twenty-four hours' urine, January 14th to 15th. Specific gravity 1016; 2.8 c.cm. of decinormal soda required for 10 c.cm.; acidity 3.5.

Result.—Alkaline in less than twenty-four hours; ammoniacal in thirty-six hours.

(*b*) Twenty-four hours' specimen, February 11th to 12th. Acidity — 2.5 (alkaline).

Result.—Ammoniacal in twenty-four hours.

(*c*) Morning specimen, February 3rd to 4th. Acidity 8.9. Alkaline in two days and ammoniacal in three.

(*d*) Specimen to which acid sodium phosphate had been added, artificially raising the acidity to 20.

Result.—Alkaline in four days and ammoniacal in five days.

To stop putrefaction altogether the acidity must be raised to 80 or 90—that is, seven or eight times as high as it is possible for it to be raised by giving drugs by the mouth.

In the experiments with *Staphylococcus pyogenes aureus* tubes of filtered urine were taken, shown to be sterile by incubating for twenty-four hours without change, and sown with staphylococcus from a young agar culture. The tubes were then incubated at body temperature. In this way the staphylococcus is found to grow very readily in urine, and is seen as a deposit of minute whitish granules, which tend to adhere to the sides of the tube. It breaks up urea, giving rise to ammoniacal fermentation, but the characteristic foul smell of advanced putrefaction is generally absent. Its growth is favoured by alkalinity, and is delayed by acidity in the same manner as is putrefaction. The time of the first appearance of free ammonia, as in the case of putrefaction, was taken as the gauge of the rate of growth, and similar experiments in the putrefactive ones were performed. The results are illustrated in Fig. 2. The only differences of importance are that the staphylococcus is a little more active and the experiments more constant than those with the mixed organisms of putrefaction. Now and again strains of *Staphylococcus aureus* will be encountered which, though quite vigorous on culture media, fail to grow actively in urine, and take double or treble the above time to ferment urea.

The *Bacillus coli* was grown in sterile urine in the same way as staphylococci. It grows very readily, and appears as a fine cloudy deposit which renders the urine uniformly

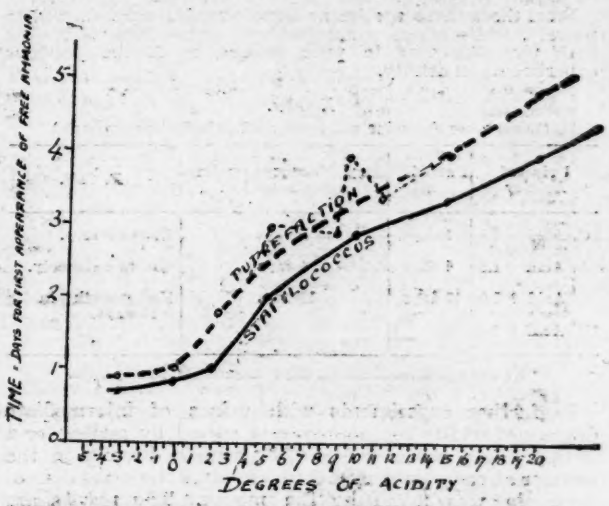

Fig. 2.—The effect of variations in the acidity upon the rate of alkaline fermentation.

turbid. On shaking or stirring, peculiar glistening swirls are seen.

The *B. coli* is sometimes seen in urine joined end to end, and forming a long spirillum-like structure, which in a hanging drop worms its way among the normal motile bacilli. Sown back to agar the bacillus assumed its normal form, and these curious forms appear to occur more frequently in old growths in urine. In urine made artificially many times more acid or more alkaline than occurs in the body, the *B. coli* will grow; and, despite what is said to the contrary, no marked differences are observed in its rate of growth, whether the urine be acid or alkaline. It grows more readily in acid urine, but the inhibitory effect of alkaline urines is quite inconsiderable.

The *B. coli* does not cause alkaline fermentation, and in consequence it is impossible to obtain any such simple indication of its rate of growth as with the other organisms. I therefore made the simple observations that either (1) the organisms grew readily; (2) grew with difficulty, or (3) grew not at all.

THE EFFECT OF DRUGS.

1. HEXAMETHYLENETETRAMINE AND ITS DERIVATIVES.

Urotropin.

Hexamethylenetetramine, commonly known by the trade name of urotropin, was discovered by Butlerow in 1860 as a chemical substance, and introduced as a drug in 1894 by Nicolaier. It was first suggested as a solvent for uric acid in the same way as was piperazine. The use of both these drugs as solvents of uric acid in the body is now discredited, but the action of urotropin as a urinary antiseptic is

established. The fact that urotropin is synthesized from formaldehyde, and readily yields that substance on boiling with acid, suggested that its action was due to the liberation of formaldehyde in the urine. Nicolaier, in his early papers on the subject, showed that the disinfecting power of urotropin in the urine varied a good deal with temperature and other conditions, and he expressed the view that the action of the drug was due to the formation of formaldehyde. Caspar demonstrated formaldehyde in the urine of certain patients taking urotropin. Citron considered that the formaldehyde was present as a loose soda compound. Cotyl and Salus came to the conclusion that the antiseptic action was due to urotropin itself, and not to formaldehyde. Cammidge failed to find formaldehyde in the urine, and concluded that urotropin does not act by its formation; and recently L'Esperance has made the surprising suggestion that formaldehyde occurs after taking urotropin in the urine of some individuals, but not others.

Experiments with Urotropin.

1. Bacteriological experiments as to the antiseptic power of the drug. Samples of twenty-four hours' specimens of urine, obtained as follows, were used:

A. Urotropin, 10 gr. t.d.s. taken. Acidity + 1.5.
B. Urotropin, 10 gr. with acid sodium phosphate, 30 gr. t.d.s. Acidity + 7.0.
C. Urotropin, 10 gr. with potassium citrate, 60 gr. t.d.s. Acidity − 1.5 (alkaline).

From these three specimens some samples were allowed to putrefy, while others were sterilized by the filter and sown with the organisms in pure culture, as in the previous experiments on acidity.

Results.

(In all cases the urine was incubated at body temperature.)

Urine of Acidity	Putrefies in	Staphylococcus renders Ammoniacal in	*B. Coli.*
C. Acid − 1.5 (alkaline)	2 days	3 days	Grows freely.
A. Acid + 1.5	4 days	4 days	Grows not freely.
Acid + 5.0	12 days	10 days	No growth in 14 days.
*B. Acid + 7.0			

* No change after fourteen days' incubation in any case.

In further experiments with urines of intermediate degrees of acidity the acidity was varied by adding acid sodium phosphate or sodium bicarbonate directly in the manner already described. In all cases the same dose of urotropin was taken by the mouth. The results are shown with those tabulated in the subjoined curve (Fig. 3).

These experiments demonstrate that the antiseptic power of urotropin in alkaline or neutral urine is almost *nil*, that this power rises rapidly as the acidity increases, and when the latter reaches about 4 (that is, slightly above the normal), it becomes absolute and the urine remains indefinitely sterile. Furthermore, no differences of any importance were here observed in the cases of the different organisms; all were affected in much the same way. These experiments can only be explained by the assumption that in the urines of higher acidity there is present an antiseptic of considerable power which does not exist in the urines which are alkaline or of low acidity.

The degree of antiseptic power of these acid urines was to some extent ascertained as follows: It was found that urotropin urine of acidity 7 (Specimen B) was added in varying proportions to normal urine of acidity 3.9; one part of this urotropin urine with nine parts of the normal urine was sterile when incubated. Now in these experiments 30 grains of urotropin was taken in the twenty-four hours, and about 50 oz. of urine was secreted during that time. Urotropin is shown by the bromine water test to appear in the urine about twenty minutes after its administration, and to persist for about twenty-four hours after this has ceased. Not all, but probably the greater part, of the 30 grains is therefore contained in the 50 oz. of urine, so that the strength of the substance secreted in the urine will be about 1 in 1,000 or less, and this further diluted to the extent of 1 in 10 is, as we have seen, sufficient to prevent putrefaction. I found that if carbolic acid be added to urine to stop putrefaction, about 1 in 800 is required for the purpose, so that the antiseptic substance in acid urotropin urine must be at least ten times as powerful as carbolic acid. Moreover, Mosso and Paleotti have shown that if formaldehyde be added directly to urine it stops putrefaction when of a strength of 1 in 10,000, and has a definite antiseptic effect when present 1 in 50,000, so that it is obvious that the substance present in acid urotropin urine corresponds closely in antiseptic power with formaldehyde and with no other known antiseptic which could be present.

It remains to demonstrate the presence of formaldehyde in urotropin urine, and if possible to determine the conditions of its formation. It is upon a failure to do this that the workers, who have come to the conclusion that uro-

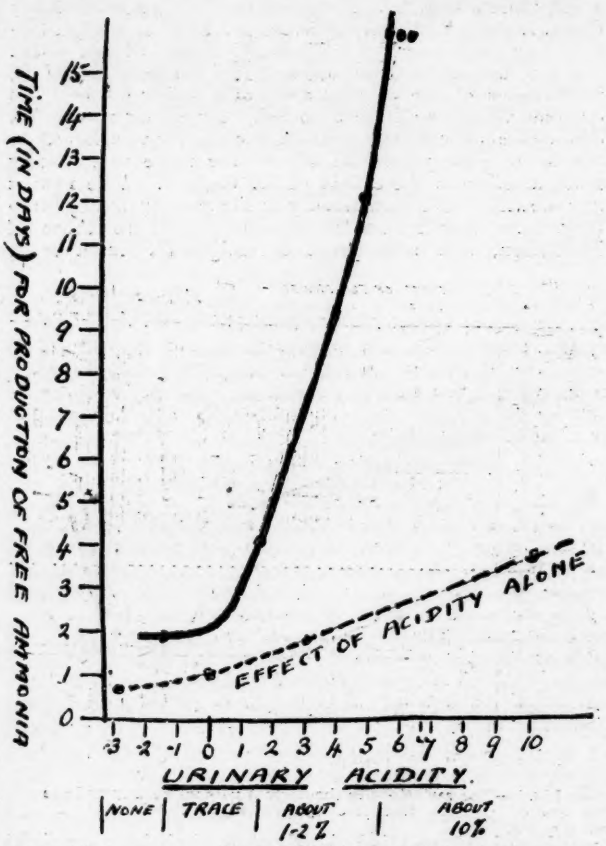

Fig. 3.—To show the effect of acidity upon urotropin. (Against putrefaction.)

tropin does not act by the formation of formaldehyde, have based their views. Cammidge showed that 5 per cent. of urotropin in neutral solution was required to exert the same antiseptic power as 0.08 per cent. of formaldehyde.

It is obvious which of these figures corresponds most nearly to the maximum possible strength of the substance present in a urotropin urine, with antiseptic power, yet Cammidge concluded from a failure to detect it chemically that no formaldehyde was present. He used as tests for formaldehyde the reduction of Fehling's solution, the resorcin test, and Schiff's rosanilin reaction. I repeated some of his experiments with results corresponding to his. He does not appear to have realized in how small an amount the formaldehyde would be, if present, for he mentions the fact that urotropin urine never smells of formaldehyde as evidence against its presence.

A solution of 1 in 10,000, which would exert quite a powerful antiseptic action, as we have seen, would, of course, have not the slightest smell. Moreover, none of Cammidge's tests, if tried upon a 1 in 10,000 solution of formaldehyde, is positive. There is, however, an extremely delicate test which will readily detect 1 in 200,000 of formaldehyde or even less. Th's is the phloroglucin test. A 1 per cent. solution of phloroglucin with 25 per cent. of alcohol is made with distilled water, and a little strong caustic soda solution added. A few drops of this

gives a bright cherry-red colour with solutions of formaldehyde. In testing for small amounts the solution should be added slowly, and the colour appears in a few seconds and fades after a time (probably by reason of the combination of the formaldehyde and the soda). The test solution must be fresh. With this test I have never failed to detect formaldehyde in acid urotropin urine. A distinct red colour is produced on adding the test fluid directly to the urine which is not produced in normal urine or in alkaline urine containing urotropin. The demonstration may be made more obvious by distilling the urine *in vacuo* at body temperature and testing the distillate, when a bright cherry-red colour is produced. Boiling is of course inadmissible, since formaldehyde might then be produced by the heat.

Experiments to elucidate the conditions under which formaldehyde is formed in urotropin urine:

Broth Culture Experiments with Urotropin.

Broth cultures to which drugs had been added as described were infected with the staphylococcus and incubated for twenty-four hours.

Drugs Added to Culture.	*Result.*
(1) Urotropin 1 in 1,000 with trace of NaH_2PO_4	No growth.
(2) Urotropin 1 in 300 with trace of NaH_2PO_4..	No growth.
(3) Urotropin 1 in 100 alone	Grew slightly.
(4) Urotropin 1 in 20 alone	No growth.
(5) Urotropin 1 in 20 with trace of $NaHCO_3$ ...	Grew slightly.

These experiments demonstrate that outside the body the addition of a trace of an acid salt to urotropin will enormously increase its antiseptic power. They also show that in natural solution a strength of 1 in 20 will inhibit growth, but that this property is destroyed by the addition of alkali; an explanation of this fact is given later.

Chemical Experiments.

By means of the phloroglucin reaction not only can very small amounts of formaldehyde be detected, but, in addition, from the depth of colour a rough indication of the strength of the solution can be obtained. For this purpose the test is applied and the colour matched by adding the same amount of phloroglucin solution under identical conditions to solutions of formaldehyde of different known strengths. When the colour is identical the strength of the formaldehyde may be assumed to be nearly so. In this way a rough quantitative estimate is obtained.

EXPERIMENTS.

A solution of urotropin in distilled water of strength 1 in 1,000, that is, about the strength in which it occurs in urine, was made up, and samples of it were incubated at body temperature for twenty-four hours.

(*a*) In neutral solution it was found that the slightest trace of formaldehyde was liberated, probably about 1 in 200,000.

(*b*) In solution with a small amount of acid sodium phosphate, or a trace of a mineral acid, a strong reaction was given, the colour indicating a strength of 1 in 10,000.

(*c*) In solution with a small amount of sodium bicarbonate or other alkali no reaction is given, even after prolonged incubation. This, of course, explains the differences in the behaviour of tubes 4 and 5 in the last described broth-culture experiments.

(*d*) Lastly, if a solution is acidified, incubated, and gives the reaction indicating about 1 in 10,000 formaldehyde, and to it is then added sufficient sodium bicarbonate to make it alkaline, together with a slight trace of ammonia, after twenty-four hours' incubation it fails to show the least trace of formaldehyde; all the urotropin has been reconstituted.

It will be seen that these chemical experiments are in every respect consistent with those in which the actual effects of urotropin as a urinary antiseptic were investigated, provided that it be accepted that its powers are due to formaldehyde. Urotropin in solution is a comparatively unstable substance. In acid solution it tends to disintegrate into formaldehyde and ammonium compounds. In alkaline solution the reaction tends the other way. Various factors—the dilution, the time allowed, and, above all, the temperature—will affect these reactions, which in extreme circumstances may be made to take place the reverse way, but, from a pharmacological point of view, one is only concerned with these factors as they occur in the body when urotropin is being given as a drug—namely, with a dilution of 1 in 1,000 or less, and with effects taking place during a number of hours at a temperature of about 37° C. If these conditions are observed, it is found that urotropin in neutral solution disintegrates, yielding formaldehyde to very small extent—namely, about 0.05 per cent. to 0.1 per cent. In alkaline solution no dissociation occurs. In acid solutions the percentage of urotropin which breaks up increases considerably, in a degree related to the acidity, so that with an acidity corresponding to that of acid urine about 10 per cent. is split up into formaldehyde.

It has been shown that these processes occur in urine when urotropin has been taken; hexamethylenetetramine itself is not an antiseptic, and the antiseptic power of the drug runs parallel with, and can only be explained by, the amount of formaldehyde present. So that the object in giving urotropin as a urinary antiseptic is to exhibit formaldehyde in the urine, and to keep this in view constitutes, I believe, the key to the correct use of the drug.

Helmitol, Hetraline, Cystopurin, etc.

The success of urotropin as a drug was naturally followed by attempts to improve upon it. Of these the most notable is the introduction of helmitol, which is hexamethylenetetramine-anhydro-methylene-citrate. Unlike the original substance, this compound yields formaldehyde as readily under the influence of alkalis as of acids—in the test tube—and it might be expected, and indeed is claimed, that it will act as well in alkaline as in acid urine. There is evidence that the hexamethylenetetramine element in this drug when taken by the mouth acts as does urotropin. There is some experimental evidence which would point to the other element yielding formaldehyde in the blood. But there is no direct evidence that helmitol yields formaldehyde in alkaline urine, and indeed it is doubtful whether formaldehyde could exist for long in alkaline urine at all.

Experiments on the lines of those above described which I have made with helmitol showed it to be as inert as is urotropin in alkaline urine, no formaldehyde being detected after taking it unless the urine were acid. So that I consider there is no pharmacological evidence of any superiority in this drug as a urinary antiseptic.

Other derivatives which have been produced are hetraline, which is hexamethylenetetramine-dioxybenzene; citramin, which is a mixture of urotropin and helmitol; and recently cystopurin, which is a mixture of hexamethylenetetramine and sodium acetate, the latter being added as a "diuretic."

I know of no pharmacological evidence as to any differences in action of the first substance from the original urotropin, while from what has been said as to the necessity of acidity of urine, it may be safely stated that the addition of sodium acetate in cystopurin can only be detrimental, although the dose is so small that the effect is inappreciable. In conclusion, one can only say that as urinary antiseptics there is no real evidence of superiority in any of these derivitives over the original substance.

Hexamethylenetetramine in Cerebro-Spinal Fluid and Bile.

The fact that this substance is excreted in other secretions besides urine has often been demonstrated. It has been found in appreciable quantities in cerebro-spinal fluid, bile, and saliva, and it is likely that so readily soluble a substance permeates the tissue fluids generally.

This naturally suggested its use as a disinfectant of these fluids, and it has been used considerably in meningitis, as a prophylactic against meningeal infection before operation, in compound fractures of the skull, etc., and to a less extent in cholecystitis. It has also been given in pericarditis, synovitis, etc. There is a certain amount of clinical evidence as to its value in cerebro-spinal fluid and bile.

From what has been said above as to the action of this substance, it will be apparent that since all these fluids are alkaline one would not expect to get any appreciable antiseptic action. None the less, the faintly alkaline and ammonia-free cerebro-spinal fluid is very different to alkaline urine, and if any formaldehyde were present in it it would continue to exist and exert its action. So that these drugs are certainly worth further trial in this connexion, and, owing to its properties, "helmitol" would appear likely to be the most efficient for these purposes.

2. Sandalwood Oil.

Sandalwood oil has largely superseded copaiba and cubebs, and is generally reputed to be the most efficient of the essential oils. It contains two substances allied to the sequiterpenes—santalol and santalal. In the last few years these substances, or combinations of them, have been put upon the market under the names of gonosan, santyl, etc. Santyl, which is santalol-salicylate, is highly praised from a clinical standpoint, and in consequence some experiments were done with it to compare its efficiency with that of the crude oil.

Sandalwood oil, like most other essential oils, is excreted in the urine partly unchanged and partly as a compound of glycuronic acid. Its reputation as a urinary antiseptic is not great, though it is acknowledged to be of value in the treatment of gonorrhoea. It would seem that here it must act as an antiseptic, though some writers regard its action rather as an "astringent" to the mucous membrane, because in cases of gonorrhoea which are benefited by sandalwood oil, other and more powerful antiseptics are said to be of little avail. This astringent speculation is nonsense; none of the essential oils exhibit astringent properties. Urotropin has not been given a full trial; Leedham-Green found it useful in certain stages of the complaint.

Experiments with Sandalwood Oil.

The sandalwood oil was taken in gelatine capsules in doses of 20 minims three times a day, and specimens of the resulting urine were used. The acidity of the specimens was varied by the method of direct addition (v. s.):

1. Putrefaction:

Acidity.	*Time for First Appearance of Free Ammonia.*
− 2 (alkaline)	1 day.
+ 3.5	4 days.
+ 10	7 days.

Some cloudiness in 24 hours in all these tubes.

2. Growth of *B. coli* in sterilized sandalwood-oil urine:

Acidity.	*Result.*
− 2 (alkaline)	Growing freely in 24 hours.
+ 3.5	" " "
+ 10	" " "
+ 15	" " 48 hours.

3. Growth of staphylococcus in sterilized sandalwood-oil urine:

Acidity.	*Time for First Appearance of Free Ammonia.*
− 2 (alkaline)	3 days.
+ 3.5	9 days.
+ 10	14 days.
+ 15	Growing but not alkaline in 14 days.

It will be seen that the action of sandalwood oil against putrefaction is very feeble. It about doubles the time the urine takes to putrefy. In the case of the *Bacillus coli* there is practically no antiseptic action at all, this organism growing quite well in sandalwood-oil urine. With the staphylococcus, however, the case is entirely different; here there is quite a powerful antiseptic effect. In alkaline urine sandalwood oil is far more potent against the staphylococcus than is urotropin, while though in urines of higher acidity it does not entirely prevent the growth of the organism as does urotropin, it has yet a marked and powerful effect.

This selective action of the drug upon a particular organism was so unexpected that to exclude the possibility of error all these experiments with the staphylococcus were repeated, using controls of normal urine of corresponding acidities, but similar results were obtained, and there seems no question of the accuracy of the observations, although it is possible that they cannot be applied to every strain of the *Staphylococcus aureus*.

It was noticed that in the sandalwood-oil urine which was undergoing putrefaction, while there was a delay in the appearance of free ammonia, the cloudiness of commencing putrefaction appeared fully as early as it does in normal urine. It may be suggested that this is due to a restraining influence of the drug on the putrefactive cocci rather than the bacilli, if, as seems likely, we assume that the cocci are the chief agents in breaking up urea. Moreover, the fact of the value of sandalwood oil against the gonococcus would be explained if we assume this selective action to extent to cocci generally. However this may be, there seems to be no doubt that sandalwood oil has a considerable degree of power in preventing the growth of staphylococcus, while towards the other organisms it is almost inert.

Experiments with Santalol Salicylate (Santyl).

To obtain some idea of the comparative values of sandalwood oil, and of its derivative santalol salicylate (santyl), some specimens of urine after taking the latter drug were allowed to putrefy, and the results compared with those obtained with the crude oil.

Experiments.

(Doses of santyl of 30 minims t.d.s.; 24 hours' urine used.)

Acidity.	*Time for First Appearance of Free Ammonia.*
− 2 (alkaline)	2 days.
+ 2 (acid)	3 days.
+ 5 (acid)	5 days.
+ 10 (acid)	8 days.

These results are slightly better than those with the crude oil, but since the dose was nearly double that of the latter it must be concluded that santalol salicylate has a rather feebler action than has sandalwood oil; this can, however, be made up for by the fact that the drug can be given in larger doses, and it is less unpleasant to take.

3. Salicylic Acid.

Salicylic acid was chosen as a representative of those coal-tar products which have a urinary antiseptic action. Of these, salol-phenol salicylate is reputed to be the most powerful, but since it has a double action, due to its two constituents, it seemed not to be so suitable for experimental purposes.

Salicylic acid is excreted in the urine as salicyluric acid and as sodium salicylate. In an acid urine some of this sodium salicylate is split up, yielding the free acid. As a pure antiseptic it probably does not matter much in what form salicylates are taken, but the acid itself has the power of increasing the urinary acidity to some extent, and it was among many drugs used for this purpose before the introduction of acid sodium phosphate. With a view to getting some idea of this secondary action, I took salicylic acid instead of any of its derivatives.

Experiments with Salicylic Acid.

Salicylic acid in doses of 20 grains three times daily. Twenty-four hours' specimens of urine used. No appreciable increase in the acidity of the twenty-four hours' urine resulted. The twenty-four hours' specimens with which the pure culture experiments were made had an acidity of 3.5, that is, slightly below the average.

Hutchison, who investigated this point, found that the acidity was increased. Possibly had the drug been taken for a longer period, the average acidities would have shown some increase, but my result shows that this action is very feeble and quite insignificant.

For investigating the antiseptic action experiments were done of the same kind as with the other substances.

Putrefaction.

Acidity.	Time Taken to Become Alkaline.	Time Taken to Become Ammoniacal.
− 3.5 (alkaline) ...	1–2 days	2 days
+ 3.5	4 days	5 days
+ 10	8 days	10 days

Some specimens of higher acidities were clear at the end of ten days.

Experiments with the Staphylococcus.

Acidity.	Time Taken to Become Alkaline.	Time Taken to Become Ammoniacal.
− 2 (alkaline) ...	2 days	3 days
+ 3.5	3 days	4 days
+ 10*	—	—

*Not alkaline at the end of 10 days.

Experiments with the Bacillus coli.

In urines of all acidities up to 10 the bacillus was growing well in twenty-four hours; in the urines of higher acidity it was forty-eight hours before any growth was apparent, and the organism was not growing well then.

It will be noticed that the antiseptic power of salicylic acid in the urines of high acidity is somewhat greater than can be accounted for by the increase in the acidity alone; this may be due to an alteration of the proportions between salicylic acid and salicyluric acid, but this is not likely, since upon investigation I find there is no great difference between the powers of these substances as antiseptics.

BENZOIC ACID AND AMMONIUM BENZOATE.

These drugs, like salicylic acid, are used as urinary antiseptics and also for the purpose of increasing urinary acidity, for both of which purposes their reputation is higher than that of salicylic acid. The increase in acidity is, of course, due in part at least to the formation of hippuric acid. I found that this increase in acidity is quite a real and decided one. After taking 15 grains of ammonium benzoate t.d.s., the acidity of the "morning specimen" was raised to between 5 and 6, the average being nearer the latter, and one specimen at 6.5 being obtained. Benzoic acid does not yield any higher degree of acidity than does ammonium benzoate, and I could not find that it possesses any advantage over the salt. The benzoates are thus second only to acid sodium phosphate in raising urinary acidity (this was first demonstrated by Hutchison), and it would naturally seem that by taking the two salts in conjunction a urine of acidity representing the sum of the increase due to each might be got. This, however, appears not to be the case. The resulting urine has only an acidity such as might be obtained from acid sodium phosphate alone. I have twice confirmed this fact, but can suggest no explanation of it. As regards the antiseptic power of the benzoates, alkaline benzoic urine appears to possess no antiseptic power worth speaking of. It putrefies, and the organisms grow in it almost exactly as in normal alkaline urine. As the acidity increases, a retarding effect upon putrefaction and upon *B. coli* become apparent, so that with a moderate acidity putrefaction takes three or four days and *B. coli* grows not freely. With a high acidity (7 or 8) putrefaction is partially inhibited—that is to say, though the urine becomes cloudy and organisms are growing in them, alkaline fermentation does not take place even after ten days or so. The *B. coli* in those highly acid benzoic urines grows very sparsely—there is definite and decided inhibition. The staphylococcus, on the other hand, seems quite unaffected by benzoic urine. A vigorous specimen will render even highly acid benzoic urine ammoniacal in twenty-four hours. It will be seen that in the case of both benzoic and salicylic acids there is an increase in antiseptic power in the highly acid urine, which is greater than can be accounted for by the increase in acidity alone.

BORIC ACID.

Boric acid, given by the mouth, as a urinary antiseptic does not seem to have yet obtained general recognition—for example, this use of it is not mentioned in most text-book accounts of the drug, but it has been extensively used and is strongly recommended by several writers. Freyer says he has found it most useful as a urinary antiseptic, and Newman places it next to urotropin.

The drug was taken in doses of 30 grains four times daily. These large doses I found unpleasant to take, and one dose induced extreme nausea, so that I think it would be better to keep within the limit of the pharmacopoeial dosage for repeated administration.

The experiments with acid boric urine showed that the urine took from four to five days to putrefy; that the staphylococcus did not render it ammoniacal until three or four days had elapsed; and that the *B. coli* grew in it with difficulty.

When boric acid and potassium citrate were taken in conjunction so that the resulting urine was alkaline to the extent of 2 degrees, there was very little alteration in the results. *B. coli* grew even more badly, and the putrefaction took four days, while the staphylococcus required between three and four days to liberate free ammonia.

Some results in urine passed at different times after the cessation of taking the drug show that it is rapidly excreted.

By far the most important results here were those with the alkaline urine. It will be seen that the antiseptic power of boric acid is apparently practically unaffected by the reaction of the urine. In this respect it differs from all the other drugs I have investigated, and it is undoubtedly, even when taken in large doses, by far and away the most efficient urinary antiseptic when the urine is alkaline and cannot be made acid. It will also be seen that it is apparently of equal efficiency against the different micro-organisms.

UVA URSI AND ARBUTIN.

An infusion of uva ursi leaves is a very old preparation in urinary therapeutics. It is generally stated to have a diuretic and mild antiseptic action, and in this respect is classed with infusion of buchu, and generally used as a vehicle for more powerful antiseptics or antispasmodic drugs. It has, however, been praised as an antiseptic by various German writers; and, moreover, it contains a substance—arbutin—which is excreted as hydro-quinone in the urine, and, since hydro-quinone is known to be an antiseptic two or three times as powerful as carbolic acid, the antiseptic action of uva ursi is said to be due to this, and the arbutin is sometimes referred to as the "active principle" of the drug; moreover, on this account arbutin has itself been given as a urinary antiseptic. Upon this matter some doubt exists; Hale White in his *Textbook of Materia Medica* says, "The disinfectant action of uva ursi is probably due to the decomposition of arbutin. . . . Against this it is urged that giving arbutin does not disinfect the urine, but others deny this, and probably the first-mentioned view is correct." With these facts in view the action of uva ursi itself and of arbutin were investigated under exactly comparable conditions.

Experiments with Uva Ursi.

The uva ursi was taken in the form of a preparation known as "pil. vesicaesan," which is stated to be a dried alcoholic extract of uva ursi leaves, each pill being equivalent to 7½ grains of the leaves. Seven of these pills were taken four times daily, being thus the equivalent of about 2-oz. doses of the infusion of uva ursi. The resulting urine became a dark brown colour on exposure to air.

Specimens of the resulting urine were treated in an exactly similar way to those with the other drugs. I found that the drug has a slight but noticeable diuretic action. That as regards putrefaction the specimens as passed (acidity = 4) putrefied very slowly, taking from four days to a week to become ammoniacal; that the highly acid specimens (acidity = 10) took at least a week to become ammoniacal; but that the alkaline specimens were ammoniacal in forty-eight hours, the normal time being here about doubled. The *B. coli* grew fairly readily in acid specimens but very badly in alkaline ones. It does, however, grow in them and can be demonstrated after a fortnight has elapsed. The staphylococcus is very little affected by this drug. The growth appears to be slightly inhibited, but only to a very small extent.

It thus appears that uva ursi has a general urinary antiseptic action at least equal to that of salicylates, and for *B. coli* in alkaline urine it is second only if not equal to boric acid.

Experiments with Arbutin.

The arbutin was taken in doses of 20 grains three times daily in solution in water. It resembles quinine in appearance and taste, but is less bitter and much more soluble in distilled water. The diuretic action was distinctly more marked than with uva ursi. The resulting urine became almost completely black on exposure to the air. From these results it would seem as if in these doses more arbutin was being taken than was contained in the uva ursi. Unfortunately I have not yet been able to ascertain how much arbutin any preparation of uva ursi contains, and so to make certain of this.

The urine after arbutin was examined in a similar way to that after uva ursi. The results differed but to a slight extent from those obtained with normal urine. The time of putrefaction was somewhat delayed, but the organisms in pure culture grew with the utmost readiness. In consequence, I consider that arbutin is, as regards antiseptic action, certainly not the active principle of uva ursi. This

action of the latter is very possibly due largely to the essential oils, but certainly not entirely, nor probably chiefly, to the arbutin.

As regards the diuretic effect, arbutin seems likely to be the chief agent, but I am convinced that in all other respects it is no substitute for the crude drug.

SUMMARY AND CONCLUSIONS.

1. The acidity of the urine is readily increased to an extent of more than double the normal by acid sodium phosphate, and to a considerably less extent by benzoates. With large doses of citrates it is easily rendered alkaline.

2. Putrefaction of the urine and the growth of the staphylococcus is aided by alkalinity and delayed by acidity in proportion to the amount thereof. The reverse is the case with *B. coli*, but only to a small extent; its growth in both acid and alkaline urines quite luxuriant.

3. Hexamethylenetetramine is not itself antiseptic, but acts by producing formaldehyde in the urine. This only takes place in acid urine, and the drug is inert in alkaline urine. The degree of antiseptic power is proportionate to the acidity, and where this is normal or higher the drug is far the most efficient of all the urinary antiseptics. Despite its undoubtedly different behaviour in the test tube, there is no evidence that helmitol acts differently to hexamethylenetetramine in the urine, and this remark applies also to citramine, hetraline, and cystopurin.

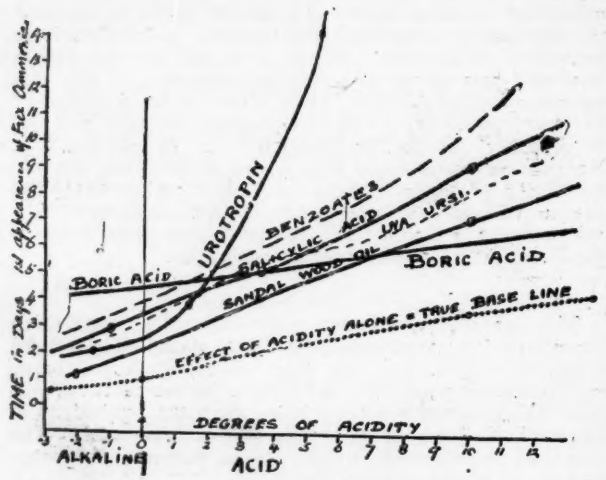

Fig. 4.—The effect of the degree of urinary acidity upon the antiseptic power of the different drugs against putrefaction.

4. Sandalwood oil is a bad general antiseptic, but appears to have a specific action on the staphylococcus which may apply to cocci generally. It is of some use in alkaline urine.

5. Benzoic and salicylic acids are very similar in action. Both are fairly efficient antiseptics in the urine, but are of very little use in alkaline urine.

6. Boric acid is an efficient antiseptic. Its action is unaffected by alkalinity, so that it is the most efficient drug in alkaline urine we possess.

7. Uva ursi is quite a good antiseptic. Its action is certainly not due chiefly to the arbutin it contains.

The whole of this work was done with a view to its clinical application and the drugs were chosen, and investigated with a view to obtaining increased knowledge of their therapeutic application. The following are, I think, legitimate practical deductions.

1. The use of urotropin (together with acid sodium phosphate which should always be given with it) as a prophylactic before any operation or procedure where the urine may become infected is of the utmost value, since if the urine is clean and highly acid, and sufficient urotropin is given in small doses to keep it continually present, the urine will not support the life of any organism, and becomes indeed a powerfully antiseptic fluid.

2. Urotropin should only be given where the urine is or can be made acid, otherwise it is inert. It should never be given with potassium citrate in *B. coli* infections. If it is desired to try the effect of making the urine alkaline in these conditions use boric acid and uva ursi infusion.

3. Where the urine is undergoing ammoniacal fermentation in the bladder, bladder washes or some operative procedure will always be the most important part of the treatment. The best drugs to use are boric acid in large doses, uva ursi, and possibly sandalwood oil.

4. Sandalwood oil is always worth trying in a cystitis due to the staphylococcus alone.

5. When acid sodium phosphate is prescribed it is as well to write chemical formula ($Na\ H_2\ Po_4$) on the prescription and to ascertain that the right phosphate has been dispensed. It is worth while in giving this drug to estimate the acidity of the urine occasionally (after the simple manner described) to make sure that there is an increase, unless the acidity is kept above 4 or 5 urotropin will not act efficiently, and a high acidity is of much more value than a large dose of urotropin.

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EIGHTY-FIRST ANNUAL MEETING

OF THE

British Medical Association.

Held in Brighton on July 23rd, 24th, and 25th.

PROCEEDINGS OF SECTIONS.

SECTION OF PHARMACOLOGY, THERAPEUTICS, AND DIETETICS.

W. HALE WHITE, M.D., F.R.C.P., President.

PRESIDENT'S INTRODUCTORY REMARKS.

AFTER the expression of a brief welcome to the members of the Section present and a few references to the work to be done, the President declared the Session open.

DISCUSSION ON URINARY ANTISEPTICS.

OPENING PAPER.

By J. W. THOMSON WALKER, M.B., F.R.C.S.,
Surgeon to Hampstead General and North-West London Hospital, Assistant-Surgeon to St. Peter's Hospital.

THE use of drugs for the purpose of influencing bacterial growth in the urine is no new thing, but the scientific study of urinary antiseptics is of recent development, and is still in its earliest stages. A wide field is opening up in which the chemist, the bacteriologist, the physician, and the surgeon must all co-operate if really useful results are to be obtained.

Pioneer work has been done in this country by Robert Hutchison and by the admirable articles of Jordan, in Germany by Nicolaier and Caspar, and in America by Burnam and L'Esperance.

Up to the present time there has been a tendency for the work to be too exclusively pathological, or too purely clinical in its nature. It is the combination of the scientific with the practical sides of this question which is most likely to give us trustworthy information. Those who rely entirely upon laboratory work for their views on urinary antiseptics must be prepared for some degree of disappointment when they come to apply in practice the knowledge so gained. We owe a great deal to laboratory investigation of the different urinary antiseptics, but we must remember that the information obtained in this manner may require considerable modification when the subject is the living body and the conditions under which the drugs are used are the varying phases of different diseases.

Drug.	In Circulation.	Excreted by.	Excreted as.	Antiseptic and Disinfectant Action.	Effect on Reaction of the Urine.	Selective Action.
Hexamethylene tetramine urotropi'n (condensation product of ammonia and formaldehyde)	In large part unaltered; small amount of formaldehyde has been detected	Largely by kidneys, also traces in bile, pancreatic fluid, saliva, secretions of nasal sinuses and middle ear, cerebro-spinal fluid, synovial fluid	Decomposed in acid urine and formaldehyde liberated	Antiseptic action depends upon production of formaldehyde, which only takes place in acid urine; formaldehyde added directly to urine stops putrefaction in strength of 1 in 10,000; the growth of typhoid bacillus and streptococcus inhibited in solution of 1 in 20,000; 1 in 5,000 destroys typhoid bacillus and streptococcus in 24 hours, *Bacillus pyocyaneus* in 48 hours, colon bacillus in 4 days; *Staphylococcus aureus* alive after 7 days, but destroyed in 48 hours by 1 in 2,000	Acidity slightly increased	Typhoid bacillus and streptococcus most sensitive; *Staphylococcus aureus* most resistant.
*Benzoic acid, ammonium benzoate, sodium benzoate	Combined with glycocoll to form hippuric acid	Kidneys	Hippuric acid, small amount as benzoic acid	Benzoic acid 1 in 2,000 inhibits putrefaction; 1 in 400 prevents multiplication of pus cocci; sodium benzoate 1 in 100 has slight retarding influence on growth of bacteria; alkaline benzoic urine has no antiseptic action	Increase acidity; benzoic acid not more effective than ammonium benzoate	*Bacillus coli* grows very sparsely in benzoic urine; staphylococcus quite unaffected.
†Boric acid, boracic acid, sodium borate (borax)	—	Kidneys	Over one-half the quantity excreted in 12 hours, after that in traces for 5 days	Disinfectant action very feeble; antiseptic influence distinct; 2½ per cent. prevents development of bacteria, but exposure to 4 per cent. solution for 24 hours does not prevent subsequent growth	No effect	——
‡Salicylic acid, salol	Some oxidation takes place; combines with glycocoll to form salicyluric acid; probably circulates as sodium salicylate	Kidneys, skin, breast, liver	Salicyluric acid and sodium salicylate	As a germicide equals, if it does not surpass, phenol; 1 in 1,500 prevents development of bacteria in organic mixtures; 1 in 3,000 to 1 in 4,000 kills bacteria; 1 in 5,000 kills *Bacillus coli* in 10 minutes; the neutral salts of salicylic acid are not germicidal in 1 in 4,000 solution; the form in which the benzoi derivatives are excreted by the kidneys is generally much less irritant and antiseptic than those in which they are administered	Acidity slightly increased	Fermentation and growth of staphylococcus in urine delayed; *Bacillus coli* growth hardly affected.
Sandalwood oil, contains santalol and santalal	Some oil partly oxidized, rest unchanged	Kidneys, small amount by lungs	Some oil unchanged, the rest in combination with glycuronic acid	Slight retardation of putrefaction of urine, and bacterial growth somewhat retarded	—	*Bacillus coli* growth practically unaffected; putrefaction not delayed; growth of staphylococcus delayed six or seven times the normal period (Jordan); the gonococcus may grow readily in culture media made up with sandalwood oil urine instead of water.

* No advantage in combining benzoates with sodium acid phosphate with view to increase acidity of urine (Jordan).
† Four per cent. is saturated solution used in surgery.
‡ If much protein present the salicylic acid preparations are less efficient than phenol.

There are many obvious fallacies which reduce the value of purely laboratory work. Mixed infections, common in urinary disease, are difficult to reproduce, yet the influence of the different bacteria upon the growth of others is undoubted.

In the body the bacterial toxins are constantly being removed and neutralized by the tissues, whereas in laboratory experiments they accumulate and must eventually tend to reduce or even destroy the growth of the bacteria. The bactericidal action of living tissues cannot be reproduced, and even exactly similar conditions of light and heat to those present in the body are difficult to obtain.

It is acknowledged that the presence of large quantities of protein greatly reduce the efficacy of antiseptics and disinfectants, most of which act by their affinity for the proteins of the bacteria. In the diseased urinary tract the bacteria are suspended in protein-rich medium, and the bactericidal substances combine more readily with the protein-containing medium outside the bacteria. Ehrlich and Bechhold have done good service in drawing attention to the effect of proteins in protecting bacteria from the action of bactericides. As Sulzberger pertinently remarks, "What we really care to know about a pharmaceutical preparation, in particular about an antiseptic, is not its germicidal powers in an artificial culture medium, but its disease-destroying properties in the living body."

A urinary antiseptic is peculiar in that it passes through two selective organs—the intestine and the kidneys—and for a time circulates in a powerful oxidizing agent, the blood, before finally appearing in a solution of uncertain concentration at the seat of bacterial growth. The ideal urinary antiseptic would be one which is readily absorbed from the intestinal tract, and is non-irritating at the point of absorption, which is so stable as to remain unchanged in the blood, which is excreted entirely, or in large proportion, by the kidneys, and is non-irritating to these organs; and, finally, which will exert an antiseptic action on the bacteria commonly found in the urine in a state of dilution, which will not cause irritation in the urinary passages. Such a perfect drug we do not at present possess.

I have placed in the above table a list of the principal drugs used as urinary antiseptics, with some particulars concerning each.

I. The Formaldehyde Series of Urinary Antiseptics.

By far the most important of these drugs is hexamethylenetetramine or hexamethylenamine. This is so generally known under the proprietary name of urotropin that I shall refer to it under this shorter name.

Urotropin, a condensation product of ammonia and formaldehyde, was first used as a urinary antiseptic by Nicolaier. Urotropin has no antiseptic action so long as its constituents, ammonia and formaldehyde, are in combination. An aqueous solution (10 per cent.) to which a little ammonia has been added to prevent the splitting off of formaldehyde, has no antiseptic power on cultures of the typhoid bacillus, *Bacillus coli*, or on staphylococci.

Urotropin is rapidly absorbed from the intestine without causing irritation, even in fairly large doses. In the blood it circulates as urotropin, although a very small amount of

formaldehyde is split off and can be detected by the more delicate formaldehyde tests. The greater part of the drug is excreted by the kidneys, but it has also been found in the bile and pancreatic secretion, in the sputum (Armstrong and Goodman), and in the secretions of the nasal sinuses and middle ear. It has been demonstrated in the cerebro-spinal fluid obtained by lumbar puncture (Flexner and Clark) and in the synovial fluid. In regard to its antiseptic value in these fluids other than the urine, we are not concerned to-day.

In the urine urotropin is split and formaldehyde is given off. There is no longer, I think, any doubt that the antiseptic power of urotropin on the urine is due to the splitting off of formaldehyde.

With the phloroglucin and Rimini-Burnam tests, to which I shall refer later, we are now able to demonstrate the presence or absence of formaldehyde in the urine and make accurate observations. According to a rough estimate by Burnam, the administration of 5 or 10 grains of urotropin thrice daily will give a solution of about 1 in 5,000 or stronger of formaldehyde in the urine.

The solution of formaldehyde thus obtained may be insufficient to prevent the development of bacteria, for I have seen a pronounced bacilluria develop in a case of stricture where the patient was taking 30 grains of urotropin daily and formaldehyde was being freely liberated in the urine.

I shall refer briefly to the excretion of urotropin in a normal individual. After a dose of 10 or 15 grains of urotropoin, urotropin or formaldehyde can be detected in the urine in about an hour, but it is frequently delayed for longer than this—two, or even three, hours is not unusual in my experience. I have never seen it appear in the urine in fifteen or thirty minutes after oral administration, as is stated by Burnam. The excretion is at its maximum during a period of from four to eight hours after administration. After about twelve hours the excretion is still going on in small quantities. I have detected formaldehyde in the urine seventeen and even twenty-two and a half hours after a single dose of 15 grains of urotropin. It would thus be possible, by taking two doses of 15 grains in twenty-four hours and passing water as seldom as possible, to keep the urine in the bladder continuously mixed with a strong solution of formaldehyde.

In diseases of the bladder, in which frequent micturition is a symptom, the period during which the bladder is under the influence of formaldehyde—urine is reduced to the time during which the drug is being excreted in quantity by the kidneys, and this may be a much shorter time, probably about six or eight hours. In such cases small doses frequently repeated (5 grains every four hours) will be more effective in giving a continuous antiseptic action.

I may say a few words in regard to the question of dosage; 5 or 10 grains taken three times daily is, I think, the common dose. An increase in the dose to 15 or 20 grains three times daily will be followed by an increased output of formaldehyde in the urine. In a number of cases under my observation no formaldehyde was produced in the urine when the patient was taking 5 or 10 grains, but there was abundance of formaldehyde with doses of 15 or 20 grains. Or when the formaldehyde reaction was feeble with the smaller doses, it became powerful when the dose was doubled or trebled.

There is a limit to the increase in dosage, which in some individuals is very quickly reached. Urotropin itself is non-toxic, but the liberation of a high percentage of formalin in the urine gives rise to irritation of the urinary tract. Irritability of the bladder, frequent micturition, and eventually strangury may occur. Haematuria has been recorded in a fairly large number of cases.

These symptoms have been known to follow small doses (2½ grains) in certain individuals, but this idiosyncrasy is fortunately uncommon. Most patients can take 15 or even 20 grains three times a day without any irritation. On the whole I am inclined to prescribe larger doses than is customary, and this is especially the case where I am dealing with an infection of long standing. It is better, I think, to produce a powerful action, and do it for a short time, than to be content with a feeble antiseptic action spread over a long time. The symptoms of an overdose of urotropin are, after all, not of a very alarming or of a permanent character, and can be quickly controlled by ceasing the administration of the drug and giving an alkaline mixture; 25 or 30 grains repeated every four or six hours for twenty-four or forty-eight hours may suffice to cut short an infection which will drag on for weeks or months with smaller doses. It is a wise precaution before giving these larger doses to ascertain by smaller doses if the patient has any idiosyncrasy in regard to urotropin.

II. The Effect upon Bacterial Growth or upon the Action of Urinary Antiseptics of Variation in the Reaction of the Urine.

I shall now pass to consider the effect of variation in the reaction of the urine: Firstly, upon bacterial growth in the urinary tract; and secondly, upon the action of urinary antiseptics.

The normal acidity of the urine is due to the presence of sodium acid phosphate. There is seldom any difficulty in lowering the acidity of the urine and giving it a moderately alkaline reaction. The drugs which are commonly used for this purpose are potassium citrate and acetate and sodium bicarbonate. The latter drug is, in my experience, the most powerful.

It is a much more difficult matter to turn an alkaline urine acid. There are two types of alkaline urine met with in practice. One is a faintly alkaline urine which deposits phosphates and which, apart from the change in reaction, is normal in other respects. The second is a powerfully alkaline urine with ammoniacal decomposition, in which there is an abundant growth of bacteria, together with other abnormal constituents, such as mucus, pus, and blood.

The value of the different drugs used for rendering alkaline urine acid was investigated by Dr. Robert Hutchison, and his important article has formed the basis for subsequent work on this subject. Mineral acids (hydrochloric, sulphuric, phosphoric) have an extremely slight action. Organic acids (tartaric, acetic, citric, and lactic) have a slight but distinct action in increasing the acidity of the urine. Benzoic and boric acids have no influence on the reaction of the urine. Dr. Hutchison recommended the administration of sodium acid phosphate with the view of increasing the acidity of the urine, and this drug has proved of great value.

In regard to benzoic acid, or rather, to ammonium benzoate—for the acid is so poorly soluble as to necessitate excessive quantities of fluid being added to it—my experience does not coincide with the observation made by Dr. Hutchison. Ammonium benzoate in doses of 15 or 20 grains thrice daily has in some of my cases rendered a strongly alkaline ammoniacal urine acid after a few doses, when sodium acid phosphate in doses of 30 grains thrice daily has failed to change the reaction. This action is not invariable, but it is sufficiently reliable to make the drug rank with sodium acid phosphate as an acidifier of the urine.

What now is the importance of variations in the reaction of the urine in relation to the subject of urinary antiseptics? A varying reaction may either affect bacterial growth directly, or interfere with or aid the action of urinary antiseptics.

1. The Effect of an Alkaline Urine upon Urinary Infection.

The treatment of urinary infection by the administration of alkalis has been especially used in the pyelitis of childhood. It has also been extended to the pyelitis of pregnancy, and is occasionally advocated in adult pyelonephritis. The pyelitis of childhood is an infection of the renal pelvis with a pure culture of the *Bacillus coli communis* and the alkaline treatment of these cases is the settled practice with the great majority of physicians.

Potassium citrate and potassium acetate and sodium bicarbonate are the drugs usually given, in doses of from 24 to 48 grains in twenty-four hours. Under this treatment the urine becomes alkaline either after a few doses or in two or three days. When this has been accomplished the symptoms subside. The temperature falls to normal, the drowsiness and mental oppression vanish, the pain ceases, and the frequent micturition and scalding disappear.

If the alkaline treatment is discontinued there is a tendency for the temperature to rise again and the

symptoms reappear. Resumption of the alkaline treatment is again followed by disappearance of the symptoms. Eventually the alkalis may be discontinued altogether without recurrence of the symptoms. When alkalis are not given these cases recover, but they tend to run a long course, with frequent relapses and often with the complication of spread of the infection to the kidney.

From clinical experience in these cases, the impression appears to have arisen that the development of the *Bacillus coli communis* is inhibited or the growth destroyed by the action of alkalis, and this view has apparently obtained support from the observation that when the urine is decomposing and ammoniacal, the *Bacillus coli* is either not the infecting agent, or, if it is present, it occupies an entirely subordinate position. Bacteriologists, on the other hand, deny that any disinfectant, or even antiseptic action is exercised by alkalis in strengths such as can be developed in the urine.

According to Jordan the *Bacillus coli* will grow in urine made artificially many times more alkaline than occurs in the body, and, "despite what is said to the contrary, no marked differences are observed in its rate of growth, whether the urine be acid or alkaline."

There appears to be here a direct conflict between clinical and bacteriological work. How is it possible to reconcile these apparently opposing views?

I will relate the following case, which may help to elucidate the matter:

I was asked by my colleague, Dr. G. A. Sutherland, to examine a patient who had passed through an acute attack of pyelitis. The history was briefly as follows:

Caroline M., aged 28, was admitted to the Hampstead General Hospital on April 19th, 1913. Since April 3rd there had been increased frequency of micturition and scalding. She had been constipated, with one attack of diarrhoea, and the urine was thick and reddish in colour. On admission the temperature was 101° F., and the pulse 116, and there was herpes labialis. The muscles of the left side of the abdomen were rigid, and the left kidney was large and tender. The urine showed a pure growth of *Bacillus coli*.

The patient was placed on a mixture of potassium citrate and potassium acetate (15 grains of each every eight hours), alternating with urotropin (15 grains).

During the next ten days the left kidney diminished in size, and the right was no longer palpable. Sodium bicarbonate was substituted for the medicine on May 2nd. On May 9th the temperature was normal and the kidney less in size.

On May 13th the urine was faintly acid, contained a few pus cells, and many masses of pure *Bacillus coli*.

I saw the patient on the 23rd, and found the left kidney slightly enlarged and tender, but all the symptoms had disappeared. The urine contained some mucus, and there was well-marked bacilluria. I suggested omission of the alkalis and the administration of urotropin alone in increasing doses. Urotropin was given in doses of 20 grains thrice daily. On the 27th the urine became acid, and a specimen on the 28th showed a few pus cells and a few colonies of *Bacillus coli* in culture.

On June 6th the urotropin was increased to 25 grains three times daily, and after a few days the urine became continuously acid.

After a few days the urine was found to be sterile, and it has since remained so.

The points of interest about this case are that the symptoms rapidly disappeared under alkalis; that after the symptoms had entirely disappeared there remained a bacilluria which persisted in spite of continued alkaline treatment; that this bacilluria was rapidly cured by large doses of urotropin.

We have here, I think, an explanation of the opposing statements made by the clinician and bacteriologist. The apparent cure in these cases is only a cure so far as the symptoms are concerned, for the bacterial infection remains and the bacteria are still active and numerous.

The action of the alkalis in pyelitis appears to me to be a neutralization of the acid toxaemia produced by the *Bacillus coli*. The cures which are claimed clinically are not cures in the bacteriological sense, for the infection remains, only the symptoms which were due to the acids or acid endotoxins have disappeared. I would suggest, therefore, that the proper treatment in these acute cases of pure *Bacillus coli* infection is the following: There should first be a course of alkalis and the urine kept alkaline until some days after the symptoms have completely disappeared. The alkalis should then be omitted and urinary antiseptics given in increasing doses. If the urine remains alkaline after the alkalis have been omitted, sodium acid phosphate or ammonium benzoate should be given to render it acid and cause the breaking up of urotropin. The antiseptic course should not be commenced too soon, lest there be a recurrence of symptoms.

2. I shall now turn to the second part of the reaction question—namely, *the effect of alkalis upon the efficacy of urinary antiseptics.*

It has long been recognized that the action of urotropin is more powerful in an acid than in an alkaline urine, that the combination of urotropin with sodium acid phosphate assisted its action, while the combination with alkalis retarded it.

With the recognition that urotropin acted only by the production of formaldehyde, the question of efficacy has turned upon the splitting of urotropin in an alkaline and in an acid urine.

A good deal of discussion has waged around this point. One of the chief difficulties has been the lack of an accurate test which will distinguish formaldehyde from urotropin. Hehner's test (a purple violet ring on the addition of strong sulphuric acid) has been much used. It is a test of extreme delicacy, but it does not distinguish between solutions of varying strength, such as 1 in 10,000 and 1 in 100,000, and, further, it fails to differentiate between urotropin and formaldehyde.

There are two reliable tests for formaldehyde with which all who are interested in the subject of urinary antiseptics should be familiar:

1. *Phloroglucin Test.*

The following solutions are used: (*a*) Aqueous solution of phloroglucin (1 per cent.); (*b*) solution of caustic soda (30 per cent.). A few drops of phloroglucin solution are added to the urine in a test tube, and then 5 drops of the caustic soda solution. A bright cherry-red colour appears if formaldehyde is present, but no colour if there is only urotropin in the urine. This test will show the presence of formaldehyde in a dilution of 1 in 50,000 in the urine.

2. *Burnam's Modification of Rimini's Test.*

The following three solutions are used: (*a*) Phenylhydrazine hydrochloride, 0.5 per cent.; (*b*) sodium nitroprusside, 5 per cent.; (*c*) sodium hydrate, saturated solution.

Three drops of each of the first two solutions are added to the urine, and a few drops of the sodium hydrate solution poured along the side of the test tube.

If formaldehyde is present, a deep greenish black colour passes down through the urine and clouds the fluid. This rapidly changes to green, and fades through bright green to orange and pale yellow.

The urine and the sodium hydrate solution should be warmed to slightly above body temperature. This test will detect formaldehyde in urine in a dilution of 1 in 150,000, but does not show the reaction with urotropin. According to Burnam, there is an intense dark blue colour, changing to green in solutions of 1 in 20,000 or stronger, and in solutions of less strength the first colour is an intense green. If these tests for formaldehyde are negative, a fresh sample of urine should be boiled after the addition of a few drops of sulphuric acid. The test is then applied, and if the formaldehyde reaction is now present the urine has contained urotropin.

Of these two tests I prefer the Rimini-Burnam test. The colour is very striking, and there is little or no difficulty in deciding as to a positive or negative result. With this test I have made observations on 230 patients suffering from all varieties of urinary disease as well as a number of normal individuals. In many of these cases the phloroglucin test was also used. I have to acknowledge valuable help in collecting these cases from Dr. Pearce at St. Peter's Hospital, and Dr. Erlank, at the Hampstead Hospital.

Turning now to the question as to whether formaldehyde is split off from urotropin in an alkaline or neutral urine—

(*a*) There is in the first place the question as to whether urotropin is effective when prescribed with an alkali. Take first a normal individual, with a sterile, slightly acid urine, in whom formaldehyde is liberated in the urine with ordinary doses of urotropin. After the administration of 15 grains of urotropin formaldehyde appeared in the urine in two hours. Twenty grains of sodium bicarbonate were then administered. Half an hour later the urine had become alkaline and formaldehyde was no longer present, although urotropin was being excreted. Forty grains of sodium acid phosphate were given, and a further dose of 20 grains two hours later. Three and a half hours later the urine was again acid, and formaldehyde was present in quantity. In this case, on a

single dose of urotropin, the urine was made positive to formaldehyde, negative to formaldehyde, and positive to formaldehyde again by changing the reaction.

It will be seen, therefore, that the administration of an alkali, together with urotropin, will prevent the liberation of formaldehyde. This was illustrated in practice in a case under my care where the patient had undergone prostatectomy and cystitis was present.

He was taking 15 grains of urotropin and the same amount of ammonium benzoate, and the urine was acid and formaldehyde being freely produced. The urine suddenly became alkaline, and formaldehyde disappeared. On inquiring for a possible cause I found that the doctor in attendance had given a cough mixture containing sodium bicarbonate. When this was omitted the urine again became acid, and formaldehyde was liberated.

Another patient was suffering from malignant growth of the prostate and cystitis. Suprapubic prostatectomy had been performed a year before he came into my hands, and a urinary fistula still remained.

The urine was strongly acid, contained a mixed infection in which the *Bacillus coli communis* predominated. There was great vesical irritation. With 10 grains of urotropin thrice daily formaldehyde was freely liberated in the urine. When 20 grains of potassium citrate were added the urine became alkaline and ammoniacal, and formaldehyde disappeared from the urine although urotropin was still present. On omitting the alkali, the urine became acid, and formaldehyde again appeared in the urine.

These cases should suffice to show that the prescription of an alkali with urotropin prevents altogether the production of formaldehyde and therefore destroys its antiseptic action. Any action that may be obtained from this combination is due to the alkali and would be equally well and at much less expense produced by giving the alkali alone.

(*b*) Let me now refer to the administration of urotropin alone where the urine is already alkaline.

I have alluded to two clinical types of alkaline urine, one in which the urine is habitually slightly alkaline and cloudy with undissolved phosphates and the second when there is decomposition of urea by the action of bacteria.

I should first like to point out that a normal individual who is taking urotropin regularly may produce formaldehyde at one part of the day and fail to do so at another. This is due to the varying acidity of the urine. The morning urine is the most acid, and in these individuals always shows formaldehyde, but the urine taken after meals during the alkaline tide may show urotropin but no formaldehyde. On increasing the dose or by adding an acidifying drug, such as ammonium benzoate, formaldehyde is continuously present in the urine.

I shall now turn to cases of phosphaturia. Phosphaturia in a mild form is extremely common, and it is not confined to brain workers and individuals of a nervous temperament.

In a minor degree occurring without other disease, it is of no importance in itself, but it is important to know that these patients do not liberate formaldehyde. In such cases sodium acid phosphate or ammonium benzoate must be combined with urotropin before any formaldehyde is produced.

In regard to the second type of alkaline urine, that due to bacterial decomposition of urea, the same holds good. So long as the urine remains alkaline no formaldehyde appears in the urine, and therefore no antiseptic action is obtained. The whole question of urinary antisepsis in these cases turns upon our ability to render the urine acid. If we are unable to do so an antiseptic action cannot be obtained with the formaldehyde series of urinary antiseptics.

The degree of acidity necessary for the splitting of urotropin appears to vary somewhat. With the ordinary litmus paper test a faint tinge of red will practically always mean a negative formaldehyde, and a well marked red reaction will be definitely positive. Jordan states that the urine must have an acidity of 5 or over to make certain of obtaining the antiseptic effect of urotropin. This, however, is a comparatively high acidity, and the majority of individuals split urotropin freely with a much less degree of acidity.

At this point it may be allowable to refer, in view of the knowledge we have already gained, to some combinations of hexamethylenetetramine that have been used, and have been placed before the profession with claims to certain advantages over the original form of the drug.

There are two different types:

1. *Combination with an Alkali.* — Hexamethylenetetramine with sodium acetate (cystopurin). For this combination it has been claimed that a diuretic and sedative action is combined with an increased action of hexamethylenetetramine. As would be expected from what I have already said in regard to the effect of an alkaline urine upon the splitting of urotropin, no formaldehyde is liberated during the administration of this drug unless the acidity of the urine is sufficiently high to neutralize the sodium acetate with which it is combined. As an antiseptic this combination has no action since no formaldehyde is liberated, and I have no reason to suppose that the sodium acetate would not act quite as well as an alkali without the addition of hexamethylenetetramine.

2. *Combination with Acidifying Drugs.*—Hexamethylenetetramine, formaldehyde, and citric acid (helmitol). The antiseptic action of this drug is obtained by the production of formaldehyde. It is claimed that formaldehyde is liberated more easily than in the case of urotropin, and that the drug will act as an antiseptic in alkaline as well as in acid urine. I have tried it in a number of cases when the urine was infected and alkaline, and where urotropin alone, or in combination with moderate doses of sodium acid phosphate or ammonium benzoate, had failed to liberate formaldehyde. Formaldehyde was not detected in these cases. I cannot say that I found the claim so prominently made for this drug—that it liberated formaldehyde equally well in an alkaline or an acid urine—was substantiated by clinical experience. In the neutral or mildly alkaline urine in cases of phosphaturia the same change took place as with urotropin alone—namely, the urine became acid, and formaldehyde was liberated and the phosphatic cloud disappeared from the urine. The citric acid has a recognized action in increasing the acidity of the urine, and this is a distinct advantage in neutral or faintly alkaline or in faintly acid urines. This, together with the additional formaldehyde present in the drug, leads to ready liberation of formaldehyde. But the acidifying action is a feeble one, and if the urine is distinctly alkaline the addition of sodium acid phosphate is necessary (ammonium benzoate is incompatible) in the same way as in giving urotropin.

Dioxybenzol-hexamethylenetetramine — a combination of urotropin with resorcin (hetraline)—is claimed to act with equal efficacy whether the urine be acid, alkaline, or neutral. Here the resorcin acts as an acidifier, and thus facilitates the liberation of formaldehyde. Here, again, the drug prescribed alone may offer a slight advantage over urotropin in the type of case I have indicated, but when sodium acid phosphate is used to acidify the urine I have not been able to detect any special advantage in this drug over urotropin.

III. The Causes, apart from the Reaction of Urine, which Influence the Efficacy of Urinary Antiseptics.

I shall only take up the two most important points, although there are others.

(*a*) *Idiosyncrasy.*—I shall refer under this head to the statements of two observers who have recently been working at the splitting of urotropin into formaldehyde in the urine.

According to Burnam, not more than two patients out of every ten showed any decomposition of urotropin with formaldehyde. This statement applied not only to those suffering from urinary infection, but also to normal individuals; with small doses not more than 20 per cent. showed free formaldehyde; with large doses (20 or 30 grains repeated in four or six hours) 60 per cent. showed free formaldehyde. In a few cases where formaldehyde was not present with doses of 30 grains, the dose was raised as high as 100 grains at a single dose, without causing decomposition of the urotropin.

L'Esperance used Burnam's test on 250 patients, and found that only about 50 per cent. of patients excreted formaldehyde. This was constant under all conditions of age, sex, disease, or health. The reaction of the urine was of no importance. Alkalis taken with or combined with urotropin had no effect on the production of formaldehyde. And increase in the dosage did not produce formaldehyde in negative urines.

The figures given by L'Esperance are: 130 = 52 per cent. positive, 120 = 48 per cent. negative.

I find it impossible to reconcile these statements with the results I have obtained. I have already shown in individual cases the extremely powerful effect of rendering the urine acid or alkaline. I shall now turn to larger numbers of cases.

In 230 cases, all of which were given a dose of 10 grains three times daily, there were 79 (34.3 per cent.) negative to the formaldehyde test. Of these, urotropin was being excreted but not split in 64, and 15 were negative both to formaldehyde and urotropin—that is, urotropin was not being excreted. The reaction of the urine was alkaline or neutral in 52 of the 64 formaldehyde negatives, and acid in 12.

Of the 52 alkaline negative formaldehyde cases, 28 became positive formaldehyde when the urine was made acid. In 23 the urine did not turn acid under treatment, and they remained negative to formaldehyde. In 1 the urine turned acid, but the formaldehyde test remained negative. It will be seen, therefore, that the alkalinity of the urine was the dominating factor which prevented the splitting of urotropin.

There were 12 cases of acid urine with negative formaldehyde. Of these 4 were faintly acid, and became positive when the acidity was increased; 4 were faintly acid, but there was no opportunity of increasing the acidity; 3 were faintly acid, but were cases of renal inefficiency, and the acidity could not be increased; 1 was distinctly acid and negative, the urine being foul.

Passing now to the 15 cases when no urotropin was excreted. In 8 cases a small dose was being given (5 or 10 grains), and when this was increased urotropin appeared in the urine. Three cases, with similar doses, could not be followed up. There was one case of advanced renal inefficiency and one of profuse polyuria, with very dilute urine. In 2 no cause for the absence of urotropin could be found. Certainly not more than 5 cases could be ascribed to idiosyncrasy in regard to the drug; 3 that did not split urotropin in an acid urine, and 2 that did not excrete urotropin at all.

These figures are very different from those given by the American authors I have quoted. The chief point of difference appears to me to be in the effect of alkalis in the splitting of urotropin. My results entirely corroborate the work of Jordan iu regard to the essential importance of a strongly acid urine in the production of formaldehyde from urotropin.

(*b*) *Renal Inefficiency.*—In giving urinary antiseptics we assume two things—first, that absorption takes place from the intestine; and secondly, that the antiseptic is excreted by the kidney. In regard to the first of these I have nothing to say to-day, although the subject is worthy of attention.

It is in regard to the renal function I wish to say a word. Urotropin is given in many cases of advanced disease of the kidneys in the simple faith that excretion of urotropin and liberation of formaldehyde will go on as if the kidneys were healthy. If we are to judge by experience in regard to other drugs, such as potassium iodide, opium, methylene blue, or indigo carmine, we would at once conclude that this could not be the case. So far as I know, this point has not been raised in regard to urinary antiseptics, but it is one which invites our serious attention.

Urotropin fortunately is non-toxic, and its accumulation in the blood if the kidneys were too diseased to excrete it would not have serious effects. At the same time, it would be useless to give urotropin in advanced renal disease if it is not excreted.

The following case is of interest from this point of view:

A female, aged 30, had multiple calculi removed from both kidneys five years ago. The kidneys were found septic and extensively diseased, and the patient made a very slow convalescence, during which she had one attack of anuria.

There were dyspepsia and flatulence, but no uraemic symptoms. The urine drawn by catheter from the kidneys is feebly acid (18 $\frac{N}{10}$ soda), specific gravity 1010, a trace of albumin, urea 0.7 per cent., and a deposit of red blood discs and a few granular casts and leucocytes. The *Bacillus coli communis* and the paracolon bacillus were present.

The administration of urinary antiseptics gave the following results:

1. Urotropin 10 grains thrice daily—urotropin faint reaction, no formaldehyde.
2. Urotropin 15 grains, ammonium benzoate 15 grains—urotropin faint reaction, formaldehyde absent.
3. Urotropin 20 grains, sodium acid phosphate 30 grains—urotropin faint reaction, formaldehyde absent.
4. Helmitol 10 grains, sodium acid phosphate 20 grains—no urotropin, no formaldehyde.

Here we must conclude that the urotropin is being excreted in very small amount, and that whatever is excreted is not split into formaldehyde.

By increasing the dose of urotropin it may in some cases be excreted in quantity, and if the urine can be rendered acid will be split up.

In a man of 33 suffering from bilateral calculus hydronephrosis, I removed a calculus from one ureter and short-circuited the ureter into the lower pole of the kidney after nephrolithotomy on the other side in order to circumvent the obstruction. The urine was neutral and pale, with a specific gravity of 1006 and a trace of albumin. Urotropin, 10 grains, given thrice daily, produced a faint urotropin reaction, but no formaldehyde. On increasing the urotropin to 20 grains and adding ammonium benzoate, the urine became decidedly acid, and a strong formaldehyde reaction was obtained.

From these and other similar cases I have come to the view that there are two factors which reduce the efficacy of urotropin as a urinary antiseptic in advanced disease of the kidneys. First, there is diminished excretion of the drug, and secondly, when urotropin is well excreted, the condition of the urine in these cases is unfavourable for the liberation of formaldehyde. The urine is neutral or faintly acid and copious, and it is difficult to increase the acidity.

The splitting of urotropin and liberation of formaldehyde is held by Burnam to be due to a vital action of the renal epithelium. The cases that I have just quoted appear to support this contention.

There are, however, many objections to this view. The dissociation is easily produced *in vitro* by the addition of acid and heat. In the human body the splitting of urotropin can be influenced at will by turning the urine acid or alkaline, and it is extremely unlikely that a vital phenomenon could be so easily influenced in this manner. There is, I think, no doubt that the process of disintegration of urotropin in the urine is entirely a chemical one, and depends upon an acid reaction.

IV. Have Urinary Antiseptics a Selective Action?

Urinary antiseptics act under peculiar limitations in regard to the strength of the antiseptic solution produced in the urine, so that it is well to take full advantage of any affinity, however slight, that may be shown by any of them in regard to the bacteria commonly found in the urinary tract.

In formaldehyde we have an all-round antiseptic of great power. The exact percentage of this drug found in the urine during the administration of urotropin has not been fully determined, but it is probably about 1 in 5,000 in patients taking 5 or 10 grains of urotropin thrice daily.

Formaldehyde has its most powerful effect upon the typhoid bacillus and may be said to have a selective power in regard to this bacillus and the streptococcus.

Burnam states that a solution of 1 in 5,000 destroyed the typhoid bacillus and streptococcus in twenty-four hours, the *Bacillus pyocyaneus* in forty-eight hours and the colon bacillus in four days. The *Staphylococcus aureus* was the most resistant, being alive at the end of seven days. It was completely destroyed in forty-eight hours by solution of 1 in 2,000.

Jordan has made the following suggestive statements in regard to sandalwood oil: against putrefaction the action of sandalwood oil was feeble and the *Bacillus coli* was practically unaffected. With the staphylococcus, however, there was a marked antiseptic effect in both alkaline and acid urines. The value of sandalwood oil against the gonococcus is well-known and would be explained, Jordan believes, if we assume this selective action to extend to all cocci. More work is required in regard to the action of sandalwood oil.

Benzoic urine delays putrefaction and the development of the *B. coli*, but has no effect on the staphylococcus.

In conclusion, let me make some practical observations in regard to the use of urinary antiseptics.

1. I have already suggested that the most effective treatment in acute pure *Bacillus coli* infection is, first, to neutralize the poison with alkalis, and when the symptoms have subsided to turn the urine acid and give urinary antiseptics in progressive doses.

2. In subacute and chronic cases of infection the drugs used should be dictated by the reaction of the urine.

If the urine is acid urotropin should be given alone; if it is alkaline or neutral urotropin should be combined with sodium acid phosphate or ammonium benzoate.

3. In persistent infection the dosage of urotropin should be raised until symptoms of formaldehyde irritation commence to appear.

4. The Rimini-Burnam test should be used in every case that is treated by urotropin or other formaldehyde-producing drug. Without it the physician is completely in the dark as to whether formaldehyde is being liberated or not.

DISCUSSION.

Dr. HALE WHITE said that those cases in which bacteria continued to appear in the urine at intervals during treatment were probably due to fresh doses of bacteria being excreted from some focus.

Professor BRADBURY related his experiences of various urinary antiseptics. In *Bacillus coli* cystitis he gave a combination of alkalis, henbane, and buchu followed by urotropin. He had seen marked improvement of the symptoms without diminution of the number of bacteria in the urine. He had had favourable results with helmitol and areol. In some cases in children urotropin was not so useful as potassium citrate. Sodium salicylate and salol were frequently valuable urinary antiseptics. He had formed a high opinion of cystopurin.

THE PHARMACOLOGY OF BODY TEMPERATURE.

By HENRY GRAY BARBOUR, M.D.,
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A PATIENT lying ill with a fever exhibits a high body temperature because his "heat centres" have been over-stimulated by toxins arising perhaps from bacteria, perhaps from breaking-down tissues. This over-stimulation is combated physiologically by the depressing effect of the overheated blood as it passes through the brain. It can be further combated therapeutically by antipyretic drugs which also act by depressing the temperature centres. We may not give these so-called centres too narrow an anatomical limitation, but it has long been recognized that the region of the basal ganglia (especially the caudate nucleus of the corpus striatum) plays an important part in the co-ordinating of those processes which affect body temperature. The most important of these processes include (1) those tending to raise body temperature, oxidations in the muscles and other tissues (heat production), peripheral vaso-constriction (heat sparing); (2) those tending to lower body temperature: inhibition of oxidations (lessened heat production), peripheral vaso-dilatation, increased respiration, and sweating (heat dissipation). The central apparatus which co-ordinates these processes can, like other nervous mechanisms, be influenced by cold and heat and by drugs. Such agents can never alter the nature of the nervous response; only quantitative changes which we term stimulation and depression can be elicited. This is a fundamental law of nerve pharmacology.

A. DIRECT APPLICATION OF COLD, HEAT, AND DRUGS TO CORPUS STRIATUM.

Last year in the Vienna Pharmacological Laboratory I studied the effect of temperature itself upon the temperature centres, and found that cold and heat exert a definite action directly upon the region of the corpus striatum.

The experiments were performed by a modification of the ordinary "heat puncture." The corpus striatum was punctured with a double metal tube under conditions of strict asepsis and ether anaesthesia.

This tube was left firmly in place by means of a suitable attachment to the skull, and the temperature of the region of the brain invaded could be varied at will by the passage of hot or cold water through the instrument.

Following recovery from ether, a rise in body temperature, of course, ensued as a result of the mechanical stimulation, as in the ordinary "heat puncture" made with a needle. When, however, the corpus striatum was heated to 42° C. or higher by a stream of warm water through the closed tube the rectal temperature at once responded by a *fall*.

Heat centrally applied acts, therefore, as an antipyretic; upon this fact undoubtedly depends the automaticity of the temperature centres; the overheated blood of the fever patient tending by its central depressing action to keep the body temperature from going still higher.

A striking phenomenon accompanied the experimental reduction of temperature; often within two minutes from the time of beginning to warm the centres the rabbit's ears, which previously had been cold with constricted vessels, became warm from a marked dilatation of the vessels. This shows one of the important methods of giving off bodily heat.

Since heating the temperature centres cooled the body as a whole, what was the result of submitting this part of the brain to the influence of cold? Under the influence of cooling the centres to 33° C., or lower, the curve of body temperature was again reversed and a condition of high temperature at once began anew. Was this the result of a definite cold stimulus, or was it merely a reversion to the high temperature caused by the irritating instrument? Several experimental results combined to show clearly that cold itself is an adequate stimulus to hyperpyrexia. It is effective, for example, after the fever due to the instrument has abated, it induces shivering (heat production) and peripheral vaso-constriction (heat sparing), so that it is analogous to the puncture hyperpyrexia.

Since cold and heat thus stimulate and depress the centres, it is not surprising to find that the body temperature can be similarly affected from this region of the brain by the local application of drugs. Results illustrating this point have recently been obtained in our laboratory at Yale with the assistance of Mr. E. S. Wing. The drugs were applied to the region of the caudate nucleus through an aperture made by a heat puncture instrument, and were given in such a way as to exclude changes in intracerebral pressure. By testing with dye stuffs, and later examining the brains, it was ascertained that the substances in practically all cases had had access to the lateral ventricle. We have found in a large number of such experiments with antipyrin and chloral that these two drugs will give distinct reductions of body temperature if applied to the centres in one-third of the minimum dosage required for injection into the general circulation. In the case of antipyrin centrally applied a very marked respiratory increase seems to be the chief method utilized by the body in giving off heat. With chloral centrally applied peripheral vaso-dilatation was the most striking factor. Quinine given directly into the brain in a few experiments also produced a marked fall in body temperature, accompanied by vaso-dilatation and hyperpnoea. Of course this drug reduces the body temperature by a universal inhibition of metabolic processes, thus limiting heat production; but our experiments show that the central nervous system, in this animal at least, also plays a part in the antipyretic effect of quinine by increasing heat dissipation. A few experiments upon alcohol indicate that weak solutions (5 per cent.) given into the brain reduce the body temperature; 25 per cent. and 95 per cent. alcohol have the reverse effect, undoubtedly acting as irritants.

Epinephrin intracerebrally in doses of 0.01 or 0.1 mg. per kilo always gave a fall in rectal temperature. This drug has been regarded usually as a pyretic substance when given intravenously, by which method our results were inconstant. Our animals were upon a winter diet which is regarded as less favourable to the pyretic action of epinephrin.

The characteristic action of all the above-mentioned drugs, when introduced into the region of the caudate nucleus, has been to lower the body temperature. The method evidently required to be controlled by using agents which would have the opposite effect. This was success-

fully done with caffein. Intracerebral doses of about 1 mg. per kilo will usually raise a rabbit's temperature at least 0.5° C. In some cases a marked dilatation of the pupil is observed, besides vaso-constriction (heat sparing) and an increased tonicity of the skeletal musculature (heat production).

Still more interesting were two experiments with a small dose of beta-tetra-hydronaphtylamin, the classical pyretic drug; 2 cg. given subcutaneously required three hours to raise the temperature 0.5° C. No other symptoms could be observed. The same amount introduced into the brain of a somewhat large animal caused within one hour a rise of 1.1° C. with all the characteristic effects of the drug: vaso-constriction, extreme dilatation of the pupils (this occurred within twenty-five seconds), motor excitement, convulsions, and death. This supports the claim of those who designate the higher centres as the seat of action of this drug.

The method employed, therefore, lends itself to the study of both pyretic and antipyretic drugs.

B. Paradoxical Antipyrin Action in Partially and Wholly Decerebrate Rabbits.

In connexion with the above work an interesting experimental demonstration of the paradoxical action of antipyrin was encountered. This was investigated with the assistance of Mr. C. L. Deming.

Clinicians have occasionally observed after antipyrin a decided rise in temperature, which could be ascribed to no other cause than the drug. Gottlieb has shown that this substance always increases heat production in the body, although this effect is, of course, masked by the far greater increase in heat dissipation from the results of which antipyrin derives its name and its use in medicine. A rise in body temperature after antipyrin is therefore spoken of as a "paradoxical" effect.

This effect has been obtained by other workers by placing a rabbit in a chamber warm enough to prevent heat dissipation. The drug was then limited to the exhibition of its heat-producing effect. We have achieved the same result by preventing heat dissipation in another way, by removing a portion of the heat-regulating mechanism.

The cerebrum and corpus striatum were removed (from one side only) in 18 rabbits. Most of the animals survived the operation by at least four or five days. In 9 of these cases, being those exhibiting at autopsy the fewest anatomical complications, a subnormal temperature was typical for the days following operation.

These hypopyrexia animals showed signs of collapse, asymmetrical muscular disturbances, peripheral vasoconstriction, and slow respiration. Control experiments excluded cold surroundings or loss of blood as the essential cause of the low temperature, and the animals were fed daily by stomach tube. Evidently a profound disturbance of the heat-regulating mechanism had been effected by removal of the cerebrum and corpus striatum.

Now the striking thing about these animals with subnormal temperatures was the effect of antipyrin upon them: 0.1 to 0.4 gram per kilo animal, an average antipyretic dosage for normal rabbits, produced a definite rise in temperature of from one-half to several degrees Centigrade. This was accompanied by entire absence of the vaso-dilatation usually seen after the drug and of the hyperpnoea which normally accompanies the larger doses. Instead were seen muscle stiffness passing (with the larger doses) into tonic and clonic convulsions. Thus the operation had impaired the power of the body to respond by heat dissipation, and had left intact the power of heat production. The latter was exaggerated, as seen by the tendency towards convulsions. This may have been due to the removal of cerebral inhibitory influences, which removal is known to augment the convulsive action of other drugs.

The rabbits not giving subnormal temperatures after operation behaved essentially like normal animals and responded to antipyrin in the usual way.

Several animals were bilaterally decerebrated, including corpora striata and optic thalami, and also gave the paradoxical response to antipyrin, but larger doses were usually necessary.

This action of antipyrin upon partially and wholly decerebrate animals furnishes evidence that the central mechanism for heat dissipation is probably higher than that for heat production.

Summary.

The first group of experiments mentioned show that the heath-regulating centres are directly susceptible to cold and heat, as well as to specific neuro-pharmacological action. Analogous to the high temperatures which can be produced by the "heat puncture" experiment we have demonstrated a stimulation of the temperature centres with cold, caffein, and beta-tetra-hydronaphtylamin. Depression, giving an antipyretic effect, has been obtained with chloral, antipyrin, quinine, and epinephrin.

The second series of investigations shows that animals deprived of one cerebrum and corpus striatum (often), or of both cerebra corporo striata and optic thalami (always), run a subnormal temperature for the days which they survive the operation. In such animals, when given average doses of antipyrin, the phenomena of increased heat dissipation do not occur, and those of heat production are exaggerated. The total effect is a paradoxical rise in body temperature.

NOTE.—Full details of the experimental work are now in press with the *Journal of Pharmacology and Experimental Therapeutics*.

DISCUSSION ON THE USE AND ABUSE OF HYPNOTICS.

OPENING PAPER.

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IT will be well to define clearly what is meant by the term "hypnotic." In its broadest sense it means a remedy for inducing sleep, and no doubt general measures—for example, those of hydrotherapy, electricity, etc.—might be rightly regarded as hypnotic in action. For the purposes of this discussion, however, it will be necessary to restrict the term "hypnotic" to the following definition: A drug, or combination of drugs, which produces sleep resembling natural sleep.

In every case of supposed "insomnia" it will be well first to make quite sure that absence of sleep really exists. Not infrequently a patient imagines that he has had a sleepless night, whereas he may have slept for several hours.

When insomnia really exists it must be remembered that this condition is only a symptom, and its cause in every case must be very thoroughly and carefully investigated. The immediate resource to hypnotic drugs is greatly to be deprecated, since frequently harmful results follow this procedure. Not only is there danger of the development of a drug habit, but commonly the patient develops a sad lack of self-reliance, and is apt to think that he cannot exist without these artificial aids to sleep. It must also be remembered that "sleep induced by drugs" is not the same as natural sleep, and has not the same beneficial value.

The following classification indicates the common causes of insomnia, and the use of hypnotics may be necessary in any of them:

1. *Pain*, and other conditions which act as sources of irritation and prevent sleep; for example, cold, heat, light, irritative bed clothing, eyestrain, adenoids, pruritus, etc.
2. *Nervous Causes:*
   - (*a*) Psychical causes in the sane; for example, mental emotions, as grief, worry, shock, etc. Intellectual overwork, change in the mode of life, neurasthenia, hysteria, hypochondriasis, etc.
   - (*b*) Cerebro-spinal causes; for example, cerebral irritation, meningitis, etc.
   - (*c*) The insomnia of insanity.
3. *Toxic Causes;* for example:
   - (*a*) Microbic and parasitic infections, as pneumonia, typhoid fever, influenza, rheumatism, etc.
   - (*b*) Chemical poisons, as alcohol, tea, coffee, lead, tobacco, and the insomnia so characteristic of the drug habit.
   - (*c*) Autointoxication; for example, gout, renal disease, fatigue, etc.
4. *Gastro-intestinal Causes;* for example, dyspepsia, dilatation of the stomach, constipation, and the various diseases of the gastro-intestinal and alimentary organs.

5. *Cardio-vascular Causes;* such as arterio-sclerosis, angina pectoris, and diseases of the pericardium, myocardium, or endocardium.
6. *Respiratory Diseases;* for example, asthma, bronchitis, pneumonia, etc.
7. *Genito-urinary Diseases.*
8. *The Insomnia of Physiological Epochs;* for example, menopause, old age.

It will be universally agreed that in every case of insomnia, after having carefully determined the etiological factors, the first therapeutic measures should be directed towards the treatment and removal of the cause.

Any pathological condition present should be treated by those special therapeutic measures most suitable for the particular case. In addition, general measures for promoting sleep should be carefully considered and recommended, such as a modification of the mode of life and habits of the patient as regards work, rest, diet, exercise, smoking, etc.

The conditions of the bedroom and bed itself as regards comfort, quiet, proper ventilation, warmth, etc., should be made suitable. The taking of a hot drink before bedtime may be found to suffice. Simple measures of hydrotherapy, such as baths, douches, and in severe cases warm or cold packs, may be employed before hypnotic drugs are given. In some cases massage or electrical treatment have been found helpful.

It will be found that in many cases of insomnia the employment of such measures as those just described fails to remove this distressing symptom, and in such cases where the sleeplessness is likely of itself to exercise a harmful effect on the patient's health, it will be advisable to employ some suitable hypnotic drug.

The dangers and objections attaching to the use of hypnotics should always be carefully borne in mind. They may be summarized as follows:—

1. *The Unnecessary Use of Hypnotics.*—There should always be a real necessity for the employment and continued use of hypnotics for reasons given above.
2. *The Danger of the Formation of a Drug Habit.*—This applies especially to certain hypnotics, such as morphine, and opium preparations, veronal, chloral, paraldehyde, etc.
3. *The Danger of Toxic Symptoms Resulting from the Use of Hypnotics.*—A single medicinal dose of a hypnotic drug may cause unpleasant and even alarming symptoms, and the continued use of these remedies may produce toxic symptoms, either by the simple effect of a repeated therapeutic action, or, as in the case of drugs which are slowly absorbed, such as sulphonal, trional, etc., by a cumulative action. The cumulative action of drugs which are slowly absorbed is often prevented by the avoidance of constipation.
4. *The Danger of Fatal Poisoning.*—Fatal poisoning is generally due to the patient gradually increasing the dose of the hypnotic unknown to his medical adviser, so that ultimately a dose is taken which produces dangerous, or even fatal, symptoms.
5. *Special Dangers due to Existing Disease or Age of the Patient.*—In certain diseases there is greatly increased susceptibility to particular hypnotics—for example, morphine and preparations of opium are especially potent in renal and respiratory disease and in cirrhosis of the liver; also to children these hypnotics must be prescribed in very small doses.
6. *Idiosyncrasy.*—Certain individuals have an increased susceptibility to some hypnotics, so that a large dose should not be given for the first time.
7. *The Use of Hypnotics when Other Measures of Treatment should be Employed.*—In many cases instead of giving hypnotics the giving up of work and the adoption of some special treatment ought to be advised.

The Use and Abuse of Hypnotics.

The object of this discussion will be best attained by considering hypnotics individually and discussing the uses and abuses attaching to them respectively.

Hypnotics may be conveniently classified as follows:

Classification of Hypnotics.

I. *Derivatives of Methane.*—These may be subdivided thus:—(*a*) The Chloral, Alcohol, Group: Chloral, chloralamide, choralose, butyl chloral, chloretone, hypnal, dormiol, isopral, viferral, ural, bromal; alcohol, paraldehyde; amylene hydrate, aponal, neuronal. (*b*) The Sulphonal Group: Sulphonal, trional, tetronal. (*c*) The Ureide Group: Urethane, hedonal; veronal and its derivates—medinal (sodium veronal), proponal, luminal and sodium luminal, codeonal, adalin, bromural.

II. *Opium and its Preparations and Alkaloids and their Derivatives.*—The various official preparations of opium; morphine and its preparations: codeine, apomorphine, heroin, dionin, omnipon.

III. *The Atropine Group of Hypnotics.*—Atropine, hyoscine or scopolamine, hyoscyamine, the vegetable preparations of hyoscyamus stramonium and belladonna.

IV. *Cannabis Indica and its Preparations.*

V. *The Inorganic Bromides.*

VI. *Vegetable Hypnotics* other than those mentioned above, such as hops, sumbul, etc.

VII.—*Other Hypnotics.*—Phenacetin, acetanilide (antifebrin), phenazone (antipyrin), pyramidon, aspirin, novaspirin, camphor monobromide, pellotine, etc.

Consideration of Hypnotics Seriatim.

I.—A. The Chloral, Alcohol Group.

Chloral (dose 5 to 20 grains).—This is a powerfu hypnotic, which has been used for over forty years. It is very reliable, and rapid in action owing to its solubility. It must be used with care, since it has a depressant action on the heart, and some patients have an idiosyncrasy to the drug. There is danger of drug habit in its continued use.

Chloralamide (dose 15 to 45 grains).—This is a mild hyynotic. It is a crystalline substance, moderately soluble in water. It is incompatible with alkalis which decompose it. It is a very useful drug in mild cases of insomnia.

Chloralose (dose 3 to 10 grains).—It is a powerful and often dangerous hypnotic, and sometimes produces excitement and tremors. It has a depressant action on the heart.

Butyl Chloral (dose 5 to 20 grains).—This drug has very little hypnotic action. It is sometimes useful in the insomnia of neuralgia.

Chloretone (dose 5 to 20 grains).—This is not a reliable hypnotic. It is mild in its action, and sometimes causes unpleasant gastric symptoms.

Hypnal (dose 5 to 15 grains).—This is a compound of chloral and antipyrin. It has no special advantages as a hypnotic, and is not recommended.

Dormiol (dose 5 to 40 minims).—It is a compound of amylene hydrate and chloral. It has an unpleasant taste; it is a mild hypnotic. It sometimes causes gastric disturbance, headache, and symptoms of intoxication.

Isopral (trichlor isopropyl alcohol; dose 5 to 15 grains).—It is a dangerous hypnotic. It is a cardiac depressant, and causes gastric and vasomotor disturbance.

Viferral (dose 15 to 40 grains).—This is a compound of pyridine and chloral. It is said to be a mild hypnotic, but it has not been used sufficiently to be recommended.

Ural (dose 15 to 45 grains).—This is a compound of chloral and urethane. It is a dangerous and uncertain hypnotic. Its toxic action lasts longer than its hypnotic effect.

Bromal (dose 2 to 5 grains).—It is much more toxic than chloral, and has no special advantages. It is not recommended.

Alcohol.—Some alcoholic preparation taken at night is often a most useful hypnotic, and it will commonly be employed with advantage before using special hypnotic drugs. It is especially useful in febrile conditions.

Paraldehyde (dose ½ to 2 drachms).—This drug is a very useful and safe hypnotic, producing light and natural sleep. It has an unpleasant taste, and may produce symptoms of intoxication. It should not be given in digestive or respiratory diseases.

Amylene Hydrate (dose ½ to 2 fluid drachms).—It is a mild and safe hypnotic. It acts quickly. It has an unpleasant taste, and may cause gastric disturbance and (in full doses) headache, erythemata, mental excitement, and cardiac depression.

Aponal (dose 15 to 20 grains).—This is a compound of urea and amylene hydrate. It is a mild hypnotic, and does not appear to cause unpleasant symptoms.

Neuronal (diethyl bromide acetamide; dose 5 to 20 grains).—It is a powerful hypnotic, and produces a heavy sleep like intoxication. It is a depressant drug, and may cause cardiac depression, digestive disturbances, and urticarial rashes.

B. The Sulphone Group.

Sulphonal (dimethyl-methane-diethyl sulphone).—This is a white crystalline substance, not readily soluble in water. Dose 10 to 30 grains. It is a hypnotic which has been very largely used. It produces a light natural sleep, lasting some hours. It has been successfully used in cases of insomnia of nervous origin. There are many objections to the indiscriminate use of this hypnotic. Its insolubility and slow rate of absorption often cause sleep to be

delayed for several hours. After large doses, or frequently repeated small doses, toxic symptoms may develop. These symptoms are digestive disturbances, headache, faintness, muscular inco-ordination, drowsiness, and deep coma. In some cases haematoporphyrinuria occurs. This is a very grave symptom, which is commonly followed by death. Sulphonal is a drug which is not readily excreted, and cumulative action may occur. It has been said that toxic symptoms are in some cases due to impurities in the drug.

Trional (methyl sulphonal).—This is a white crystalline substance rather more soluble in water than sulphonal. Dose 10 to 30 grains. It is a powerful hypnotic, which is useful in some nervous cases. Its toxic action is similar to but greater than that of sulphonal. It acts more quickly than sulphonal, but it should be used with caution.

Tetronal (ethyl sulphonal).—This is a white crystalline substance. Dose 10 to 20 grains. It is less soluble than sulphonal, and it is more toxic. It is a dangerous hypnotic, and is better avoided.

It will be remembered that the members of this group have recently been placed on the Poisons Schedule.

C. The Ureide Group.

Urethane (Ethyl carbamate).—A white crystalline powder, very soluble in water. Dose 10 to 60 grains. It is a very mild and safe hypnotic. It is especially suitable for children.

Hedonal.—A derivative of urethane, a white crystalline powder, slightly soluble in water. Dose 15 to 30 grains. It has an unpleasant taste. It is a mild and safe hypnotic. It sometimes causes digestive disturbance and unpleasant nervous symptoms, as giddiness, headache, or excitement.

Veronal (Diethyl barbituric acid.)—A white crystalline powder, slightly soluble in water and of bitter taste. Dose 3 to 10 grains. It is a powerful hypnotic, and has been extensively used by the profession and by the public. Veronal has been recommended for nervous cases, febrile conditions, and in respiratory and cardiac diseases. It is well, however, to remember that a milder hypnotic may be safer and equally efficacious. Veronal may in full or even moderate doses, especially if repeated, cause toxic symptoms such as drowsiness, giddiness, headache, digestive disturbances. Skin rashes of an erythematous or urticarial type, and sometimes marked mental symptoms with hallucinations and delusions, may result. Disturbances of speech and sight sometimes occur, and the gait may be reeling. In severe cases coma will supervene, and this is generally accompanied by high temperature, rapid breathing, and the clinical signs of acute pneumonia. Fatal poisoning has been recorded from relatively small doses of the drug—for example, 15 grains. Idiosyncrasy and cumulative action occur with this drug.

Medinal.—This is the sodium salt of veronal; dose 3 to 10 grains. It is very soluble in water, and therefore more rapid in action than veronal. The therapeutic effect and toxic action are similar.

Proponal (dipropyl barbituric acid; dose 2 to 8 grains).—A white crystalline powder, insoluble in water. It is a powerful hypnotic, and is more toxic than veronal. It is best avoided.

Luminal (diphenyl barbituric acid; dose 3 to 5 grains).—A white powder, insoluble in water. It is a very powerful hypnotic, and should only be used in special cases; for example, severe nervous cases.

Luminal sodium (dose 3 to 5 grains).—The sodium salt of luminal. It is very soluble in water and has too powerful an action for general use.

Codeonal (dose 2 to 10 grains).—A mixture of medinal and codeine-veronal. It has an action similar to that of veronal, but more powerful.

Veronal and its derivatives have recently been placed on the Poisons Schedule.

Adalin (bromo diethyl acetyl urea).—A white powder, nearly insoluble in water. Dose 5 to 10 grains as a sedative, 10 to 15 grains as a hypnotic. This drug has the advantage of being both a sedative and hypnotic. It is very useful in most forms of insomnia, and does not appear to cause unpleasant after-effects. No serious toxic effects from medicinal doses appear to have been recorded.

Bromural (a brom-iso valerianyl urea).—A white crystalline powder, slightly soluble in water; dose 5 to 10 grains. This appears to be a good and safe hypnotic. Its use may occasionally be followed by headache. No serious toxic effects from medicinal doses appear to have been recorded.

II. Opium and its Preparations, Alkaloids, and Derivatives.

Opium.—The use of opium and its preparations for promoting sleep is so well known that little need be said of them. Their action, generally speaking, is that of relieving pain and inducing a state of mental calm which is followed by sleep. The mild diaphoretic action of opium renders it especially useful—as, for example, in Dover's powder—in catarrhal febrile conditions.

Morphine, generally speaking, has a similar effect to opium, and there is the great advantage of hypodermic administration which ensures certainty and rapidity of action. Morphine in small doses is often most valuable in conditions associated with much pain—such as after operations, in the early stages of pneumonia, pleurisy, etc. It may with advantage be combined with atropine for this purpose—for example, morphine $\frac{1}{6}$ grain, with atropine $\frac{1}{150}$ grain. It must be remembered that morphine has an exciting effect on some patients, and is then contra-indicated.

Codeine is much milder in its action than morphine, and is less effective as a hypnotic.

Heroin (diacetyl morphine).—Dose $\frac{1}{24}$ to $\frac{1}{12}$ grain.

Dionin (ethyl-morphine).—Dose $\frac{1}{4}$ to $\frac{1}{3}$ grain. The hydrochlorides of these two alkaloids are sometimes useful instead of morphine in respiratory diseases.

Omnipon is a preparation said to contain all the alkaloids of opium; its action will therefore be similar.

It must be borne in mind that opium and its preparations, as well as the above alkaloids, have their toxic action greatly increased in cases of renal disease and cirrhosis of the liver. In respiratory diseases they must be used with caution. The danger of a drug habit is known to all.

Apomorphine has recently been highly recommended by Dr. Francis Hare for cases of alcoholism. In acute cases $\frac{1}{10}$ grain is recommended hypodermically, but watch must be kept lest vomiting should result. In chronic cases $\frac{1}{40}$ grain hypodermically usually produces a short sleep.

III. The Atropine Group of Hypnotics.

Atropine is rarely used as a hypnotic, except in combination with morphine.

Hyoscine or Scopolamine (dose $\frac{1}{300}$ to $\frac{1}{100}$ grain).—The hydrobromide of this alkaloid, if given hypodermically, has a powerful sedative effect. It is useful in severe nervous cases of insomnia, and sometimes in renal disease.

Hyoscyamine sulphate (dose $\frac{1}{200}$ to $\frac{1}{100}$ grain) has been found to be a useful hypnotic when given hypodermically in severe nervous cases of insomnia.

Of the vegetable preparations of this group of drugs, those of hyoscyamus have been found most useful as hypnotics. They are usually given in combination with other hypnotics.

IV. Cannabis Indica and its Preparations.

In certain cases of nervous insomnia these preparations have been found useful.

V. The Inorganic Bromides.

The potassium, sodium, and ammonium salts are most commonly employed. In full doses—for example, 30 grains or more—they act as mild hypnotics in cases of insomnia of nervous origin without organic disease. The bromides are generally given with advantage in combination with other hypnotics, as, for example, in the well-known prescription of Sir Lauder Brunton: Tinct. opii, ♏ v; chloral, gr. v; potassium bromide, gr. xx; aq. chloroformi, 1 oz.

VI. Vegetable Hypnotics other than those Mentioned Above.

Preparations of hops have a mild hypnotic action, and they may often be usefully employed in combination with other hypnotics.

Tincture of sumbul (dose 30 to 60 minims) has a mild sedative action and may be given with other hypnotics.

Carminative drugs—for example, oleum cajaputi, ♏ v, etc.—have often a useful adjuvant action as hypnotics.

VII. OTHER HYPNOTICS.

Phenacetin, *acetanilide* (antifebrin), *phenazone* (antipyrin), *pyramidon* (a derivative of antipyrin), are all drugs which have an analgesic and antipyretic action, so that they often act indirectly as hypnotics.

Aspirin and *novaspirin* both act as mild hypnotics in many cases, especially in cases of febrile catarrh or of neuralgic or rheumatic pains.

Camphor-monobromide (dose 2 to 10 grains) is sometimes useful as a hypnotic in special nervous cases of insomnia.

Pellotine, an alkaloid from a cactus (dose ½ to ⅔ grain hypodermically), has been said to be a safe hypnotic, but it has not been sufficiently used for its claim to be established.

Many of the abuses of hypnotics have been indicated in the above remarks. In addition it is important to bear always in mind the dangers of "self-drugging" on the part of patients. Every patient taking hypnotic drugs should be impressed by his medical adviser with the undesirability of taking them except in real necessity.

In giving prescriptions for hypnotic remedies the drug prescribed should be dispensed in such a way that the patient will not be induced to purchase the remedy for himself and dose himself. Bottles of tablets of hypnotic drugs should never be supplied except with a written label, according to the directions of the prescription. (The printed trade label should not be on the bottle.)

It would be most desirable if definite hypnotic drugs were only supplied on the prescription of a medical man. In the case of drugs of a powerful hypnotic action it would be desirable if medical practitioners wrote on the prescription, "Not to be repeated."

Many of the abuses of hypnotics can be prevented by a loyal co-operation of pharmacists with the medical profession, and this co-operation will be to the great advantage of the public and all concerned.

DISCUSSION.

Dr. MAURICE CRAIG (London) said that while it was true that some physicians prescribed hypnotics before they were really necessary, on the other hand, in his experience there was a great danger of not giving hypnotics early enough. By too long a delay a patient might lose confidence in his ability to sleep. Hypnotics should be given on definite principle and not in haphazard manner, the aim being never to let the patient have a bad night. The patient should not be allowed to continue work while taking hypnotics. Such work was never good, and the patient frequently had to rise before the effect of the drug had passed off. Some patients slept best on excitants, others on depressants, and it was very important in a given case to find this out. Hypnotics had to be used in effective doses if sleep was really bad—for example, a dose of 4 or 5 drachms of paraldehyde. Bromides were useless in serious cases, as they only confused the mind without giving sleep, and in many cases gave rise to furring of the tongue and gastric disturbances. Some sedatives acted best in combination with other hypnotics. Certain individuals had an increased susceptibility to some hypnotics. In early types of nerve exhaustion and mental disorder opium and morphine were usually worse than useless. Opiates acted best when the patient was seriously physically ill. Sulphonal had to be used with special care in young persons, but was invaluable in the chronic insane and in old persons. He tabulated the abuses of hypnotics as follows: (1) The continuance of mental work while taking hypnotics; (2) the prescribing of hypnotics by patients themselves; (3) the use of the wrong class of drugs; (4) the increase of the dose to a poisonous extent in the endeavour to obtain sleep when the usual medicinal doses had proved ineffective; (5) leaving the patient on some hypnotic night after night without bearing in mind the effect that the drug might be having on the patient.

Professor BRADBURY (Cambridge) said the views expressed by Dr. Willcox were greatly in accordance with his own in the article on "Disorders of Sleep" in Allbutt's *System of Medicine* and in his Croonian Lectures on the same subject before the Royal College of Physicians. He agreed with Dr. Willcox that many persons who were supposed to be suffering from insomnia slept more than they thought they did. Some people also required less sleep than others, finding four or five hours, or even less, quite sufficient. Much depended upon the quality of the sleep. If this were sound and unbroken it was more refreshing than that in which the patient frequently awoke and went off to sleep again. He mentioned cases in which persons awoke precisely at the same moment, night after night, at 3 a.m., and found it difficult, if not impossible, to get off again. These were generally cases of gouty insomnia, and were benefited by change of air and a laxative dose of effervescing citrate of lithia given every morning on waking. He agreed with the previous speaker as to the importance of breaking the habit of sleeplessness, and for this he knew of no better and safer drug than veronal. He prescribed it at bedtime in 5-grain doses for a woman and 10-grain for a man, washing it down with some hot water. He had never found it necessary to give more than 10-grain doses, and he had had no untoward effects, such as those mentioned by Dr. Willcox, from the drug. In his experience the remedy acted not only the night it was given, but frequently for two, three, or even four nights running, and his plan was in ordinary cases of nervous insomnia to give it only twice a week. Unlike sulphonal, which he had for a long time ceased to prescribe, veronal did not produce sleepiness and tiredness the next day, but as a rule the patients felt refreshed as if they had had ordinary sleep. He thought sulphonal a dangerous drug for insomnia unless the bowels were kept open regularly, as there was always the danger of haematoporphyrinuria and other untoward symptoms. He agreed with Dr. Maurice Craig as to the value of paraldehyde in some cases of insomnia, and as to the dose in the *British Pharmacopoeia* being too small. It should be from 1 to 4 drachms; indeed, Sir Thomas Clouston had given as much as 6 drachms in bad cases. He (the speaker) had found a dose of whisky and hot water frequently act as well as paraldehyde, and most people would agree it was a pleasanter remedy. Bromides were sometimes useful in the insomnia occurring at the menopause, especially if combined with tincture of sumbul, tincture of hops, and camphor water. In a case which came under his observation there was, however, after taking only two or three doses of 20 grains, a condition of loss of memory, temporary aphasia, etc., produced, and in other cases—as the previous speaker had mentioned—bromides upset the digestion, caused coating of the tongue, constipation, etc. Chloralamide was a drug he had found most helpful in the sleeplessness of cardiac disease, as also a hypodermic injection of morphine, as was originally recommended by his colleague Sir Clifford Allbutt. The latter remedy was sometimes useful in the insomnia of renal disease, and had been prescribed by the late Sir Stephen Mackenzie and others. Chloretone he looked upon as a somewhat dangerous drug. A patient of his, a girl aged 10, suffering from chorea after taking 5-grain doses three times a day, developed serious symptoms of cardiac failure and a condition of apathy, but after a time recovered. Hyoscine, if given cautiously, was of use in acute mania, delirium tremens, and in the insomnia of paralysis agitans. Luminal and its sodium salt had been recommended as substitutes for it, but he had no experience of these drugs. Bromural had disappointed him, and he had no experience of adalin. The phenacetin group was especially useful if the insomnia was due to pyrexia or pain or both, and pyramidon acted remarkably well in a case of locomotor ataxy under his care.

Dr. UHTHOFF (Hove) remarked on the appalling number of new hypnotics that were constantly being put forward by the trade, and each represented as superior to any previously known. He laid stress on the importance of not establishing a habit of waking at a certain time by looking at a watch, or striking a light, or taking food in the night, and on the value of aids to sleep in the form of blue pill or sodium bicarbonate in hot water, the former to reduce arterial tension, and the latter to prevent flatulence and acidity, which seemed to be so often a cause of sleeplessness.

Dr. BLACKBURN (West Hartlepool) said that the last thing that should be given for sleeplessness was a drug. In the

majority of cases the best treatment was change—to go away from the worries and anxieties of ordinary routine, etc. The best drugs were the old ones—paraldehyde, opium and chloral. In his opinion veronal and sulphonal were very dangerous drugs. In early insanity, particularly climacteric borderland cases, the treatment by three daily doses of a few minims of tincture of opium was frequently very efficacious.

Dr. HUMPHREY DAVY (Bournemouth) said that in the question of hypnotics one had to consider the state of the stomach, of the circulation, and of the brain. In regard to (1) symptoms of gastric irritation must be sought for. The use of small doses of calomel with sodium bicarbonate often brought on sleep by correcting acid secretions. In regard to (2) circulatory stimulants were often useful. In (3) disorders of the brain, a combination of hypnotic and sedative (potassium bromide and opiate) was valuable in overstrain of the brain, while in mania a combination of trional and sulphonal was better than either drug separately.

Dr. E. R. HUNT (Brighton) said that aspirin was frequently of great value during the first few nights after surgical operations. In his experience adalin acted quickly and satisfactorily in some cases, although it seemed to have no hypnotic effect on certain neurotic patients. He had, however, found that the effect quickly wore off, and in some cases, at any rate, after doses had been given for, perhaps, six or eight nights, it seemed to quite lose its effect. He did not remember having seen definitely bad results in a limited experience of the drug. The question of the prevention of the formation of a drug habit was a very difficult one, and he was doubtful as to the efficacy of noting on the prescription that it should not be repeated, especially as so many of these drugs were not scheduled. He was in the habit of going a step further in this matter, and either himself handing over the requisite number of doses to a patient or giving him an order on a particular chemist for the drug, allowing the latter to charge it to his own account and thus ensuring that the patient did not obtain either the prescription or—what was equally dangerous—the name of the drug.

Dr. GUNN (Oxford) said that this was the second public discussion that he had had the privilege of hearing upon the subject of hypnotics, and on both occasions he had formed the opinion that the discussion would have been more valuable if its scope had been more limited. He suggested that the Section of Pharmacology, having cleared the ground with a general discussion, should at the meeting next year take up one division of the subject—for example, the sulphonal and ureide groups, so that some finality of opinion might be obtained in regard to the members of those groups. He considered that this procedure would be of value not only to the practitioners, but also to those who had to select hypnotics for the *Pharmacopoeia* and to those who had to teach pharmacology. As an instance of the value of detailed information, he took the statement of Professor Bradbury, who had never found any untoward effect from a dose of 5 grains of veronal to a woman, or of 10 grains to a man. If this experience were universal, then it was a fact of the utmost value in regard to veronal. Similarly, Dr. Craig had said that sulphonal was a dangerous hypnotic for young people, but invaluable for old people. Others, he believed, had stated that sulphonal was more dangerous for women than for men. If these statements were true they ought, if possible, to be established beyond dispute and given a stamp of authority. He asked upon what grounds was based the almost universal statement that a disadvantage in regard to choral was its depressing action on the heart. He knew no reliable clinical or experimental evidence to prove that therapeutic doses of chloral had any depressant action on the heart. In the course of some experiments he had made, which were in the course of publication, he had found that it required a strength of solution of chloral hydrate above 1 in 400 to arrest the isolated heart of the rabbit or cat, and a concentration of at least 1 in 1,000 to produce any depressant action. A dose of 1 gram of chloral given to an adult of 70 kilograms, if it were all present in the blood at one time, represented a maximum concentration of 1 in 5,000 (the blood being taken as one-fourteenth of the body weight). When this dose was given by mouth, not only would this concentration not be reached, but the coefficient of distribution of chloral between the blood and heart would be different from what obtained in his experiments in such a way that the heart, for this reason too, would be subjected to a relatively much lower concentration. Judged from this point of view, the hypnotic dose of chloral came well below the heart-depressant dose, so much so that he doubted if a dose of 30 grains of chloral given by the mouth to an adult would exert the slightest depressant action on the heart. At all events, it appeared that further clinical evidence was required before the odium of a heart-depressant action should be permanently associated with one of the most certain and reliable of hypnotics.

THE ACID CHILD IN RELATION TO ERRORS IN DIET.

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THE child during its growth produces much phosphoric, hydrochloric, and sulphuric acids from the metabolism of a relatively large quantity of proteid. The results of this are reduced alkalinity of blood and increased acidity of urine, hence we have an acid child, a child whose blood and fluids are bad solvents of uric acid, and this substance is very liable to be thrown out of solution and deposited in the tissues.

The growing child also forms relatively large quantities of uric acid, and, when to this large formation considerable quantities of exogenous uric acid are added in unnatural food, it is not very extraordinary that retention and accumulation of uric acid should become the most pronounced features of child pathology.

When the solvent power of the blood is fairly good, there is excess of uric acid in the circulation. When it is poor, uric acid is driven out of the blood into the tissues. The common bilious attack, migraine headache followed by vomiting, is the sign of excess in the blood. Catarrh, pharyngitis, bronchitis, enteritis, and arthritis are the common signs of its retention in some of the tissues. These troubles have been spoken of as "diseases," but I suggest that "food poisonings" would be more correct.

The bilious attack and headache are results of obstructed capillary circulation and high blood pressure causing pressure inside the skull, dilatation of the heart, congestion of the liver, stomach, and digestive viscera, the extent of which it is now easy to measure.

The local irritations and inflammations occur when the excess of uric acid is driven out of the blood by cold, high acidity, acid food, or drinks or local injury. Child life in the food-poisoned is thus a continued oscillation from solution to retention, from collaemia (biliousness) to retention (arthritis), and vice versa.

In certain periods of life retention preponderates because the acidity is high. In other periods with lower acidity collaemia preponderates. The acid child is the stage in which retention preponderates on account of its large nitrogenous metabolism. The results which this produces both in the child and in the later stages of its life-history I am endeavouring to outline in this paper.

For the benefit of those who have not read my books I may explain that life is divided into four stages: The first retentive stage from infancy to 15 or 17, the stage of the acid child with which we are here specially concerned; the first collaemic stage from 15 or 17 to 25, in which the accumulations of the previous retentive stage are more or less dissolved, causing collaemia. The second retentive stage, the high acidity period of the prime of life, from 25 to 55; and, lastly, the second collaemic stage from 55 to old age, in which the accumulations of the second retentive stage are in their turn dissolved (see *Uric Acid*, ed. vii, p. 236).

The headache of the bilious attacks rarely gets very severe before 7 or 8 years of age, because the pain is due to blood pressure, and till this age the heart is not strong enough to keep up a pressure inside the skull which will cause pain. The child was food-poisoned long before this, but headache was not one of the prominent signs of its condition. But even though such a child does not die of acute bronchitis or enteritis, or suffer from rheumatism and

morbus cordis, it may none the less have the development of both mind and body seriously interfered with. Such children do not grow up, such food-poisoned races do not grow up either; they remain undeveloped throughout their lives, and tend to live the lower selfish life in place of the higher altruistic one; thus is the evolution of man hindered by food-poisoning.

Constipation, which is common among children on unnatural food, is a powerful factor in high acidity and retention, for it is from the large bowel that water and acid products are chiefly taken up into the blood. Hence any undue delay in this part of the intestine means increased absorption of acids and a doubly acid child.

During and after bilious attacks there is a period of collaemia, and all collaemia produces anaemia. How far this is due to increased destruction of blood elements, as, for instance, in paroxysmal haemoglobinuria, and how far to defective circulation in blood-forming glands is uncertain, but there is no doubt as to the fact that anaemia increases with collaemia and diminishes with retention.

Such anaemia becomes more marked as the first retentive stage nears its close, and may continue with increasing severity through the first collaemic stage. Everything that knocks the child over—such as a shock, injury, or severe illness—will tend to damp down the fires of life, to diminish the formation of acids, and will thus bring in collaemia and anaemia in place of the retentive troubles.

Towards the end of the first retentive stage or sooner we get a certain amount of anaemia, which, in its turn, brings in some failure in the nutrition of the heart and other muscles of the body; and we must remember that all the muscles of the body take some part in forwarding the circulation of the blood—a most important reason for seeing to their proper development and use in childhood.

An antecedent bronchitis, if severe and continued, may take a hand in straining and dilating the heart, then heart strain brings in congestive dyspepsia, and these troubles may lead on to chronic and progressive debility of the muscles, the heart, and the general metabolism. Here may originate syncopal or epileptic attacks, enuresis, chorea, insomnia, somnambulism, night terrors, and the more severe of these troubles may be accompanied by albuminuria or glycosuria as the first hints of a possible Bright's disease or diabetes; and, in any case, there is sure to be greatly diminished mental power and very defective development of mind and body.

We have thus a complete explanation of the alternation of retentive with collaemic forms of food poisoning, the latter being dependent both as regards severity and duration on the extent of the previous retention. Thus it comes about that the very uric acid which produced the rheumatism of 12 or 13 produces also the chlorosis, debility, and heart failure of 17 to 20 and their sequelae.

This poison-laden body, with its slow capillary circulation and feeble nutrition, low temperature, and anaemia, is the happy hunting ground of the ubiquitous microbe. It is thus small wonder that tuberculosis so often fastens a deadly hold on its victims in the first collaemic stage.

The excess of uric acid has three sources: (1) Formation of some excess in relation to an excessive metabolism of proteins. (2) Excess introduced in unnatural food, whether this is the milk of a mother living unnaturally, or foods, other than milk, which it may be given later on—for example, meat juice, raw pounded meat, meat extracts, soups, peas, beans, or lentils, tea, coffee, chocolate, and cocoa, of which large quantities are to-day consumed by children. (3) It retains some of that which is provided from sources 1 and 2, its fluids being too acid to hold it in solution till the kidneys can excrete it. Then once a focus of retention has been set up this tends to go on attracting more and more uric acid, acting in fact just like the well-known uric acid filter. Uric acid in the blood, like that in the urine, cannot pass a focus of retention without clinging to it.

Every move in this chain of causation, every fluctuation of uric acid from the tissues into the blood stream, or vice versa, is visibly recorded in the rate of the capillary circulation, in the blood pressure, in the size of the heart and liver. Every similar fluctuation can be easily watched and recorded in curves, every sequence foretold and, if necessary, controlled. The same circulation records also tell you when you have succeeded in clearing both blood and tissues from excess of uric acid (see "Some Circulation Factors Admitting of Easy Measurement," BRITISH MEDICAL JOURNAL, vol. ii, 1911).

A temperature chart will also tell the quantity of uric acid in the blood, as temperature is to a large extent a matter of capillary circulation. The temperature is subnormal in collaemia, especially when the heart is defective. But when the uric acid has been driven out of the circulation into some of the fibrous tissues the temperature tends to be irregular and slightly raised.

Thus the acid child retains, but the retention is not continuous, the uric acid overflows now and then into the blood, and by obstructing the circulation causes a uric acid storm or bilious attack. Most of the symptoms of this attack are, as we have seen, the mechanical results of the obstructed circulation. By the time we come to gastro-duodenal and hepatic congestion with nausea and vomiting, there is more or less marked tendency to faintness corresponding with the strain and dilatation of the heart, and the patient lies in a mixed condition between collapse, coma, and sleep. The skin and extremities are cold and the capillary circulation in them is very slow. This is the time to look for a paroxysmal albuminuria or glycosuria.

Later on sleep probably gets the best of it, the stomach having been relieved of its irritating contents, a certain amount of digestion and absorption takes place lower down in the intestines, the absorbed albumins produce a rise of urea and acidity, the blood is cleared of some of its excess of urates, the skin and extremities become warm, the attack passes off, and the child after some hours of sleep wakes well. The attack is followed by a period of good appetite after the temporary starvation; this means a further rise of acidity and urea with increasing retention of urates; the retention goes on for ten days or more and is followed by another collaemic storm; and so on through life or till the stage of life alters, substituting a more stable and permanent condition of retention or collaemia.

During the bilious attack some 15 or 20 grains of excess uric acid are excreted and, as the attack passes off, retention sets in once more. This explains why migraine generally alternates with arthritis or other gouty local troubles, being worse and more frequent when the arthritis is better and vice versa.

Many things, however, may produce a break in high acidity and retention, and thus bring back collaemia and migraine. Thus getting hot in the incoming season of spring and summer, any unwonted exertion causing perspiration and fatigue, or dyspepsia from indigestible food will lower urea and acidity (formation of acids), and increase the solvent powers of the blood for urates. Irregular meal times or an unusually long fast will do the same, hence a fast properly conducted is as powerful an eliminator of deposited urates as any drug known. Hence the remarkable way in which gout, cancer, and wealth follow in each other's track. It is difficult to grow either gout or cancer on deficient protein.

With such fall of acidity, however produced, collaemia is certain in the urate-laden; and dilatation of the heart and congestion of the digestive viscera follow. If the heart is strong there is a rise of blood pressure producing headache, but in most children there comes a time when the heart has more than it can do, and you then get a tendency to collapse with falling pressure; but with the increasing congestion of the abdominal viscera comes increasing metabolic defect, and albuminuria or glycosuria may appear (see "Metabolism and the Circulation," *Medical Record*, New York, July 12th, 1913). It is this congestion accompanied by feelings of weight and fullness in the right side that has led to bilious attacks being "chill to the liver." If gastro-intestinal putrefaction is marked owing to stoppage of digestion there may be a more or less marked rise of temperature, and this is followed later on by the passage of motions or flatus which are very offensive. Such a temperature can be brought down at once by a dose of mercury which clears the blood of uric acid and frees the capillary circulation; it is by no means necessary to purge, for all the good results can be obtained without any purgation. What is necessary is to free the circulation and thus let normal digestive processes replace putrefaction. It is at the time of the most severe collaemia and the most complete block in all digestive and metabolic processes that we get that excessive destruction of red cells that has been called "paroxysmal haemoglobinaemia," but this is only an exaggeration of

the similar destruction and resulting anemia which all collaemia produces to a greater or less extent.

But the clearing of the blood from excess of uric acid either by mercury or as Nature does it by a rise of acidity, does not clear it out of the body. It generally produces a retention in the liver, and thus an accumulation is provided ready for the next storm. There is no real cure for any of these troubles except by clearing, not the blood only, but the entire body from excess of uric acid. Hence the great success of the uric-acid-free diet by which alone complete clearance is made possible.

Such deposits may affect many other parts of the body besides those already mentioned—all the fibrous tissues, fascia, glands, the eyes, nose, pharynx, ears, and the periosteum of the teeth may be irritated by urates and eventually become enlarged and fibrosed. Many glandular enlargements in children betray their uratic origin by quickly clearing up on solvents, such as salicylates or alkalies, or on a diet containing much potato. Adenoids and tonsillitis represent the reaction of the naso-pharyngeal glands and mucosae to irritation by uric acid, and this is clearly evidenced by their well known relation to cold and damp. These troubles often attain their maximum near the end of the first retention stage, and then gradually dwindle and disappear in the first collaemic stage, thus paralleling the history of bronchitis, rheumatism, and other results of the first retention stage (see *Uric Acid*, ed. vii, p. 392).

Children are often quite insufficiently clothed and exposed to cold in houses which are badly warmed; they very often do not get nearly enough exercise, or exercise of such a kind as to develop and employ all their muscles. These are all conditions which tend to raise still further the acidity of the acid child, and thus to still further hamper the solution and removal of urates. Heat is both directly and indirectly a solvent of uric acid, and its indirect action is due to its aiding the elimination of acids from the body in perspiration.

The signs of an acid and food-poisoned child are a constant tendency to migraine or bilious attacks, dyspepsia, rheumatism, eczema, catarrh, enteritis, and with these there is often a red flushed face, giving a bright complexion often mistaken for a sign of conspicuous health, an irritable or dry skin, considerable irritability of temper, frequent micturition with a highly acid urine, which colours the collecting vessel with urates, or throws down red sand.

With regard to the bright-coloured rheumatic complexion, I believe that the difference between the English and American complexions is to some extent accounted for by difference in exposure to cold in childhood. Both nations are alike as regards the introduction of urates in foods, but the English take their poisons along with exposure to cold, which drives them out of the blood into the tissues, leaving the circulation free and the colour good, but they get arthritis, bronchitis, and other retentive troubles. American children, on the other hand, living in much warmer houses, carry more of their urates in their blood, they have a lessened tendency to arthritis but get in place of this anaemia and a more defective skin circulation, hence their relatively pale, muddy complexions. Neither child is natural, but the English child gives the more misleading appearance of health. Natural healthy colour is a general warm tone due to free circulation of good blood, but no vessels are visible.

By the time all these signs are evident in the acid child who has reached the later years of the first retention stage it may have scores, even hundreds, of grains of urate distributed throughout the tissues of the body. When the retention stage comes to an end all this quantity becomes available to pass through the blood, producing collaemia, anaemia, and all the troubles of the first collaemic stage, beginning with headache and ending perhaps in Bright's disease or diabetes.

The child is of necessity a factory of acid products on account of its rapid metabolism up to the completion of growth. Under normal conditions of food, clothing, housing and muscular exercise this high acidity of rapid combustion does no harm. The acids are neutralized and eliminated; there is no excess of uric acid for them to retain, for there is no introduction of uric acid, and all the uric acid of formation is excreted day by day as it is formed. Life is then an altogether different matter; in place of "disease" we see physiology. But when under these conditions of high acidity a large quantity of uric acid is added from without, there comes an ever-increasing tendency to retention, and this soon includes both the uric acid of introduction and that of formation. The child then gets into troubles from which there is no escape. The accumulating poisons produce effects according to the extent of the accumulations and the stage of its life-history in which they are able to act. The apparently various results have been looked upon as "diseases" simply because their real origin in food poisoning, reinforced by other abnormal life conditions, was never suspected. The best proof of this causation is to be seen in the results of bringing up a child correctly. When he is fed on natural food, warmly housed and clothed, and able to use all his muscles naturally as they grow and develop, he will himself develop into the most magnificent specimen of the human animal, and be free not only from the plague of names that to-day obscures his physiology but from almost everything that can reasonably be called "disease."

DISCUSSION.

Dr. GUNN (Oxford) said that, having read Dr. Haig's book some years ago, he made some experiments on rabbits to determine what effect, if any, uric acid produced on the blood pressure. He failed to obtain any pressor effect from intravenous injection of uric acid, and he therefore doubted one of the most important of Dr. Haig's premisses.

Dr. HAIG, in reply, said he also had obtained similar results, but that such experiments did not reproduce the conditions as regards uric acid in the blood in man.

ERRORS IN DIETETICS.

By H. F. WINSLOW, M.D.Lond.

THE subject which I have asked permission to bring before you is one which, in one aspect, is of the simplest elementary character, and which meets us at every turn in our daily life; but, on the other hand, in consequence of its universal application, is of the very greatest sphere, and affects in no small degree our personal comfort and our enjoyment of life, as well as the physical development of every one of us.

As it refers to the method of our feeding, and its effects on bodily nutrition in general, it will not be out of place to draw your attention to the common and ordinary method of taking food, in this country at least.

You will find on consideration that the taking of food does not greatly differ in the various grades of society.

We have still to acknowledge that society is divided into two principal classes—the upper or richer class, composed of the man of independent means, the professional man, and those who earn their living by the work of their brain; and the lower class, composed of those who live by the labour of their hands, the mechanician, the working man, the labourer, and such like, most of whom are maintained by the receipt of a weekly wage—a rough classification, no doubt, but sufficient for the consideration of the matter in hand. The mode of taking food, as I have already said, does not greatly differ in these two classes.

As a rule there are four meals a day for all—the breakfast, which is universal; the midday meal, which is the dinner of the working man and the luncheon of the richer class; the tea, and the late meal or supper of the working man and the late dinner of the upper class.

The breakfast and tea I would designate as the two fluid meals, seeing that they are characterized by the coffee, tea, or other fluid which is their main feature; and the dinner of the working man and the late meal which constitutes his supper, and the late dinner of the richer man and his midday luncheon as the two solid meals respectively. It is to these meals that the observations I venture to make mostly refer, but more or less remotely to all the other meals and to all other classes who partake of them.

It is familiar to us all that we begin the main meal of the day with some kind of soup, the essential element of which is a warm fluid, with a meat flavouring, but conveying only a small amount of nutritive matter: the typical form of this food is beef-tea, so universally used for sustaining the bodily powers of the invalid; but even

beef-tea and all other forms of broths must be looked upon with a certain amount of suspicion. We all may, perhaps, call to mind an experiment, quoted in many works on physiology, which was carried out on a pack of hounds; one half of the pack was fed on the fluid in which the meat was thoroughly boiled, and the other half was fed on the shreds which were left after the boiling. The half of the pack of hounds fed on the beef-tea (let us call it) became emaciated and poor, whereas those fed on the shreds maintained their rotundity, indicative of good assimilation and healthy nourishment. It is true, however, there are other kinds of soup which, doubtless, convey a fair amount of nutriment.

Now, commencing with the soups which I have mentioned, we will all agree that it is not uncommon to fortify our appetites with a glass of sherry or other fluids, with the intention of giving a stimulus to the digestive capacities of the stomach and other surfaces over which the food is passed in the natural order of digestion. It is not too much to say that there is a pretty continuous process of "sipping" throughout the whole meal, either of alcoholic fluid or of some other and perhaps more exceptional drink. And here I wish to state very clearly that I am not proposing to advocate or deprecate the use of alcoholic drinks. I am not referring now to temperance or total abstinence in any form whatever, and I prefer not to enter into that question.

The "sipping" of fluids is almost universal in all classes. The working man has his half-pint or pint of beer, the richer man has his wine or other liquor in some other but more indefinite form; and so it is that a very considerable quantity of fluid is introduced into the digestive area, to the amount of some 50 to 100 per cent. of the normal digestive fluids. And that is the pith and substance of what I wish to bring under your notice to-day. It will, I think, be generally agreed that the "sipping" of fluids of some sort or another is almost of universal custom. And I expect that there are few amongst us who could say that they never mix their solid with their fluid foods. If we take observation of animals in their normal state, they will be found never to mix their solid and fluid foods. The beasts of prey mostly hunt and kill their quarry at the close or middle of night. They carry it off and tear it in solitude, and towards morning or in the decline of day they visit the stream, or pool, and there quench their thirst, apart from the solid meal, the mid-day being mostly devoted to siesta.

Nor do we find animals that are domesticated mix their solid and fluid foods as do men. One exception to this is found in the common pig. Pigs mostly, in the domestic state, are fed on pig-wash of barley meal, bran, or grains mixed with water to make a sort of mash; and what is the result of that? They become overloaded with fat, are unwieldy and sluggish in their movements, and are almost a different tribe of animal to the wild boar, which is one of the most hardy, active, and vigorous animals—the joy of the hunter in India, full of courage and spirit. Can we not draw some inference from this instance of the difference which would follow to human beings were they nourished by solid food apart from fluids, instead of living, as they have done and still do, on a kind of "mash"? Did time allow I would like to draw your attention to milch cows as fed in some parts of America on the wash of whisky distillation—called swill-fed cattle—and the direful effects it has upon them.

As a matter of fact, human beings are fed on a kind of "mash" compounded of all sorts of heterogeneous solids and fluids which it might almost horrify us to enumerate.

Depend upon it, Nature has amply provided for the reception, the digestion, and the assimilation of all food which is requisite for our nourishment and development. The salivary glands are those which come under our more immediate observation; those glands of the stomach, which follow after, and those of the alimentary canal, no doubt are brought into similar and subsidiary action, and are, more or less remotely, affected in a similar way. The very thought of food will excite the action of the salivary glands, especially the sublingual glands, and cause a copious secretion of saliva, commonly spoken of as a "watering of the mouth"; how much more will the contact of solid particles of food urge on the secretion of that saliva. I doubt not that the drier and more crisp the food introduced into the mouth, the freer and more copious will be the salivary secretion. For instance, it will be found that a crisp and dry biscuit, such as the common water biscuit, provided it is sufficiently masticated (and that is of the first importance), will form a soft and semifluid emulsion, which, as a matter of fact, requires but little swallowing to admit it into the stomach preparatory to assimilation. If complete mastication be carried out, this class of food requires no addition of fluid to render it in a fit state for digestion in the stomach, but, I contend, is hindered in its assimilation to the very extent to which the fluid has been added. How can we reasonably expect the salivary fluids, or the gastric or other alimentary fluids, to carry out their normal functions if they are handicapped by something to the extent, or may be far beyond, their own weight? We are surely placing a burden upon the digestive functions, a burden which it is simply impossible for them to bear. What applies to dry foods such as the biscuit evidently applies in a like degree to all other solid foods, and those of a nitrogenous character; in these, the non-digestible parts, such as ligamentous and densely fibrous portions, should be removed before they are taken as food, such matters passing from us practically unaltered. The fatty and muscular parts, if fully and fairly subjected to mastication, are sufficiently and thoroughly moistened by the secretion of the glandular surface of the whole of the alimentary canal so as to require no additional extraneous fluid, and I should indeed be glad if I could impress this truth so far as to carry conviction. Do not for a moment suppose that I am advocating the entire exclusion of fluids as an article of food; that would be palpably absurd; what I wish to impress, and that with the whole power of argument at my command, is not so to mix up the fluid with the solid ingredients of our dietary as to impede and in a measure neutralize the beneficial action of the salivary and gastric juices; and that, I maintain, can be done, and done with signal and evident benefit.

It will naturally be asked by what means and by what alteration of method this reform is to be effected. The answer to that inquiry is, The solid food which we take must be allowed to be so adapted for normal assimilation by being subjected to the action of the gastric juices, unalloyed, unadulterated, and unweakened, by mixture with extraneous fluids, and that during the time that the process is going on. I am fully alive to the fact that fluid food is necessary, as well as not to be denied, but let that fluid be kept apart from the solid materials while undergoing digestion. We should therefore allow a fair interval, from half an hour to two hours, before we take our drinks.

It may be objected that the sociable character of our dinners would be much hampered—that people love to linger over their food, and to give evidence of the goodwill that they feel one for the other, by the "passing of the bottle" and the drinking of healths.

I think such an idea is imaginary and would be little supported by practical experience. The fact is that the system which I advocate tends rather to the prolongation of meals, caused by the greater time taken by a more perfect and complete mastication. Unless this be done but little benefit will be observed by any such change, and the salivary and gastric juices will remain clogged and hampered.

What, then, more simple than to commence our meal with a biscuit, or piece of toast tempered, if you wish it, with some savoury, and make that the beginning of our meal, in place of clear or other soup? Most of the dishes which follow supply their own fluid constituents, the gravy of the joint, the sauce of the pudding, and, above all and ever acceptable, the juices of the fresh fruits of the dessert. But with all this the mastication must be complete, or little good will be realized.

Any person giving expression to these thoughts will properly and naturally be asked upon what authority and evidence they are founded. Here the personal element must inevitably come in. I myself have carried out the method of feeding which I have endeavoured to describe for some time past, extending to about a year, and from that experience I feel fully justified in declaring that the statements I have made are absolutely correct. I cannot say I have ever been a martyr to dyspepsia, but, like most other people, I have had my turn now and then. Since

my change of diet and method of feeding I have had none. I have had no occasion to take medicines of any kind. I have had no depression, giving rise to the thought of neurasthenia, in any form, and, in a word—making allowance for advanced age—I have had no occasion to complain of any untoward sensations arising from dyspeptic disorders. I feel, too, that had I followed the lines set forward above ten or twenty years ago, instead of only one year or thereabouts, I should have reaped full benefit from so doing. I do not know that I could give a much higher credential.

I would only say, Do not take my word for it, but try it for yourselves, and if you find it comes up to sample you will most assuredly give salutory instruction to those who seek your advice.

I have but one word to say in conclusion, and that is, Give the salivary, gastric, and alimentary juices the fair chance which is their due, and we may be sure that they will, on their part, duly respond.

DISCUSSION.

Dr. UHTHOFF (Hove) said that he was not in agreement with Dr. Winslow in regard to taking the lower animals in all cases as our standard. For example, surely no one would advocate the consumption of meals with the rapidity that the dog gulps down its food. The point he considered of importance was not the avoidance of fluid with meals so much as the avoidance of mixing fluids with the process of mastication.

Dr. MAURICE CRAIG (London) deprecated the making of a general rule for all cases in regard to such a subject. For example, one person grew fat on taking fluids with meals whereas another lost weight, and the same might be said of taking fluids between meals. It was right to turn to the biological world when in difficulties as to what suited animals as a whole, but, on the other hand, it was a mistake to be alone guided by such an investigation.

Dr. BERNARD SMITH (London) advocated the early draught of fluid nutriment (hot cocoa, coffee, or milk) as being the first thing to be thought of in the morning. An impulse towards solid food followed naturally according to individual habit and inclination.

CONTINUOUS ANTISEPTIC INHALATION IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

By C. MUTHU, M.D.,

Physician, Mendip Hills Sanatorium, Wells, Somerset.

I.

THE ravages caused by pulmonary tuberculosis have been so persistently brought before the public during the last few years that we are all more or less interested in the study and eradication of the disease. Those of us who have been fighting this white scourge for many years are convinced that it cannot be exorcised by any kind of jugglery or by any witches' concoctions or injections. As the causes that make for tuberculosis and the conditions in which it prevails are complex and varied, so its treatment to be effective should embrace many sides and many factors, and must be proceeded with step by step, line upon line, till the patient is finally restored to health. Believe me, it takes many months and even many years for the disease to develop and manifest itself, and it also takes a considerable time to get the patient well. Nature never does things in a hurry. She builds slowly but surely. Based on these convictions, we have built up a line of treatment which has been very successful in dealing with a large number of cases of consumption. I cannot do better than describe briefly what I call the (*a*), (*b*), (*c*), or three main lines of treatment which have been systematically worked in our sanatorium for some years. They are: (*a*) Aëro-therapeutics, (*b*) breathing and graduated exercises, (*c*) continuous inhalation.

(*a*) The first line of treatment consists in building up the resisting powers of the patient by fresh air, food, and rest. The freedom of the open country with its green fields and meadows, the quiet and restful conditions imposed by sanatorium life, the new habits acquired, such as early to bed, etc., have all a psychic effect, and act favourably upon the patient's jaded mind and enable him to recuperate his failing energies. The open-air life brings him into close communion with Nature, who nurses her sick children back to health. This first step alone is sufficient to arrest the disease in some early cases.

(*b*) In the second line of treatment the patient is taken a step further. Here he is gradually introduced to various kinds of exercises—to breathing, singing, physical exercises, such as chopping, sawing and planing wood, digging broken and unbroken ground, and, as he gets nearly well, to tramping the surrounding country, camping, etc. The rationale of graduated exercises is that rest and exercise are so adjusted by the physician that for every time bacterial products escape the focus of infection, Nature responds by manufacturing protective substances from her secret laboratories. This constant conflict of toxins with antitoxins gradually increase the level of patient's resisting power till a natural immunity is created against the disease. But we must remember that the second line of treatment would be ineffective without the first. If it is absurd to expect a bankrupt to discharge his debt, it is equally futile for a patient to create antibactericidal substances when he is poor in health and low in vitality.

(*c*) Side by side with these measures, or when they have failed, the third line of treatment takes the patient still further on the way and brings its powerful aid by directly attacking the morbid activity of the bacilli and their toxins. At this stage three important therapeutic measures claim our attention—drugs, tuberculin injection, and continuous inhalation. It is not possible to deal effectively with living pathogenic organisms and their products by the administration of drugs by the mouth. If the dose is small, the potency of the drug is neutralized and becomes lost by the flow of many secretions and the blood stream it meets on the way. If the dose is large it produces a toxic effect, deranges the stomach and other digestive organs. I cannot honestly say I have seen any permanent good from administering medicines such as creasote by the mouth. Medical opinion is yet very much divided as to the efficacy of tuberculin in the treatment of consumption. My experience of tuberculin has on the whole been disappointing, and will, I am sure, be corroborated by many medical men and by the report which the King Edward Sanatorium is issuing on the subject. To expect to raise the patient's resisting powers by a course of tuberculin when his health is broken down and his vital powers are low, is like trying to squeeze money out of a bankrupt or whipping a tired and hungry horse to do more work. It does not seem right or reasonable to inject into the system what Nature throws out as poison. I still believe, what I consistently maintained for some years, that there is a risk of tuberculin injection lighting up fresh activity in a latent or quiescent tuberculous focus in the lungs or glands. Besides, a regulated system of rest and exercise has done what tuberculin professes to do, only without incurring any danger and in a more natural manner—namely, it has provoked auto-inoculations and antitoxins at the right moment, with the right dose and in the right way, thus helping to create a natural process of immunity.

II.

Of late years there has been a steady revival to introduce inhalation in the treatment of pulmonary tuberculosis. Antiseptic inhalation is a very ancient remedy. Centuries before the time of our Lord both Indian and Greek physicians made use of inhalation in the treatment of bronchial and chest affections. Charaka, Susruta, Hippocrates, Galen, Laënnec, are some of the classical names that figure in the history of inhalation treatment. While, coming to our own times, many distinguished men, such as Sir W. Roberts, Dr. Coghill, Dr. Burney Yeo, Dr. Wilson Fox in England, Dr. Beverley Robinson in New York, Dr. Ruata in Perugia, and lately Dr. David Lees, stand prominently in their advocacy of this method of treating consumption. The Indian physicians of the pre-Christian era not only used aromatic substances (which were ground into powder, made into a paste, smeared over thin tubes, and lighted, and the smoke

inhaled) as inhalants, but they gave, among other things, garlic and pepper in increasing doses. They also ordered their consumptive patients to sleep in the same room and in the same house with goats, so that they might inhale ammonia and other products given off from their urinary excretions. Curiously enough, the maggotorium establishments for consumptives, the first of which was opened in Bradford in 1911, make use of the same principle of administering the inhalation of ammonia and other gaseous emanations from maggots. Also it is noteworthy that after so many centuries garlic should be revived in the form of inhalation of allyl sulphide, by Dr. Minchin and others. So that whether in the form of volatile drugs or the emanations of ammonia from the goats or maggots, or allyl sulphide, the principle of inhalation has once more come to be recognized as a rational means in the cure of consumption.

Ever since 1895 I have been treating pulmonary tuberculosis with antiseptic inhalations; and since 1899 I have used them in combination with sanatorium treatment. At the Tuberculosis Congress held in London in 1903 I reported a group of cases successfully treated by this method of treatment.

How inhalation is used in our sanatorium. We use two methods in the sanatorium: The lamp method—where formaldehyde is vaporized in a methylated spirit-lamp, containing a hot-water boiler, the inhalation being taken in patients' own rooms with wholly or partially closed doors and windows for half an hour at a time; the continuous method—for which I have devised an inhaler after the pattern of Dr. Yeo and Dr. Ruata, which combines all the advantages without their disadvantages. It is not enough to make use of antiseptic drugs for inhalation purposes, but they must be more or less volatile, and be easily taken into the lungs in the form of vapour with the inspired air. The efficiency of the treatment lies in proportion to the degree of diffusibility of the antiseptic mixture used. We use two groups of solutions—formaldehyde and guaiacol group. The first is found in A mixture, the second in C and D, and both in B. Of all the antiseptic solutions formaldehyde stands first, as it is not only a strong germicide, but is highly volatile, and possesses great penetrating power into tissue cells. It is first introduced to the patient in A mixture, which is a mild combination, containing only 2½ per cent. in strength and made pleasant with the addition of menthol, pine, and chloroform. B is a stronger inhalant, containing 5 per cent. of formaldehyde with menthol and pine, and the whole dissolved in chloroform and alcohol. In this way I have given formaldehyde in hundreds of cases, and even to young people, without any difficulty. It possesses the property of hardening the mucous membrane of the nose and air passages; hence the patients do not feel any inconvenience after a few days. After B, the patients go on to C. B and C are our standard mixtures, and more generally used, while D, which contains iodine with guaiacol and terebene, is kept as an alternate solution, or for night use. Guaiacol is much more easily absorbed and less irritating than creasote. Where, in a very few cases, formaldehyde is not tolerated, or where pulmonary tuberculosis is complicated with the affections of the nose and throat, C and D solutions are tried from the beginning. The advantage of having more than one solution is this: The monotony of using the same mixture over and over again has a wearying effect upon the mind, whereas a constant change of inhalants keeps up a fresh interest in the treatment till success is achieved. Besides, all the solutions in succession gives the patient the advantage of trying many antiseptic drugs in the course of the treatment. Both the inhaler and the mixtures are manufactured by Messrs. Oppenheimer, Son and Co., London.

The mode of procedure is as follows: When a patient first comes to the sanatorium he is sent to bed and kept there if he shows any signs of a rise of temperature. He has the inhaler for two hours the first day, four hours the second, six hours the third, and eight hours the fourth and the following days. In this way he is gradually prepared to use the inhaler a great part of the day as well as the night. Patients keep on the inhaler while they are walking, resting, reading, or playing games, etc. In fact they are encouraged to keep on the mask at every opportunity from the time they wake up in the morning till late at night, and even during the night. And as they improve and show signs of arrest of the disease the hours are gradually reduced to six, four, and two hours a day. As I have had so many inquiries concerning the various solutions I herewith give their formulae:

A.—Formaldehyde, 2½ per cent.; chloroform, ʒj; menthol, gr.x; ol. pini pumilin., ♏x; spt. vin. rect. ad ʒj.

B.—Formaldehyde, 5 per cent.; guaiacol, ʒj; chloroform, ʒij; menthol, gr.xv; ol. pini pumilin., ♏xv; spt. vin. rect. ad ʒj.

C.—Guaiacol, ʒij; terebene, ʒj; menthol, gr.xv; ol. pini pumilin., ♏xv; chloroform, ʒij; spt. vin. rect. ad ʒj.

D.—Guaiacol, ʒij; iodine, ʒj; terebene, ʒj; ol. pini pumilin., ♏xv; chloroform, ʒij; spt. vin. rect. ad ʒj.

N.B.—About 10 drops to be sprinkled on the inhaler about every half to one hour.

One or two words of caution are here necessary for carrying out the treatment effectually. See to the purity and fresh quality of the drugs used. As formalin contains more than 50 per cent. of water, formaldehyde is conveyed into the inhalants in the form of gas to make them more volatile. Hence the solutions A and B, if not all, are better obtained from the manufacturers who have taken special pains to ensure the purity and excellence of the inhalants. Keep the mixtures in brown stoppered drop bottles, as they are very volatile. Change the lint in the mask as often as necessary; it is better to have two inhalers for day and night use; the inhalers must be worn at least eight hours a day or more for the first few weeks; it is absolutely necessary for the patient to live, as it were, with his mask and make it his friend and constant companion. The secret of success of the inhalation treatment very largely depends upon carrying it out continuously and perseveringly.

Other advantages of the inhaler are: It affords protection against strong winds and dust while walking. Colds and influenza are practically unknown in our sanatorium. When the visitors do bring a catarrhal infection from outside, the use of the mask prevents the cold from spreading downwards and starting fresh mischief in the lung. The inhaler makes the patient to take a deeper breath. It also provides a certain amount of resistance and favours the flow of blood into the lungs like Kuhn's suction mask, and facilitates healing. Two more minor advantages are that the wearing of the inhaler enables the patient to be quiet, while it keeps his time and mind occupied from dwelling too much on the disease.

III.

Many years' close observation leave no doubt in my mind that by continuous inhalation volatile antiseptics in the form of vapour mixed with air enter the alveoli as well as the bronchial passages, and get slowly absorbed into the circulation in the lungs and reach the tuberculous focus. All theoretical objections must be laid aside and should give place to clinical facts, which, after all, is the only true evidence that is worthy of notice. Case after case that have got well when other measures have failed point out that in some way antiseptic inhalations help to check, if not destroy, the morbid activity of bacterial organisms, which is seen clinically in the diminution of cough and expectoration and the reduction of temperature. A remarkable case of bronchiectasis with suspected tuberculosis that was successfully treated in 1908 by continuous inhalation (and reported in the BRITISH MEDICAL JOURNAL, September 23rd, 1911) further proves my contention that inhalation has a distinct effect in inhibiting the growth of septic organisms. Of the 20 successful cases treated in 1911 (reported at the annual meeting held at Liverpool), all have kept well, except one who went back through his own fault. He is, however, getting better. In 1912 38 cases were under the treatment from four to eleven months, out of which 18 made a good recovery and 3 greatly improved. One of the 18 that got well, writing on July 22nd, 1913, says: "I am pleased to say that I have enjoyed increasing good health ever since I left Hillgrove. At the present moment I feel better than ever. . . . Next month I shall reach the respectable age of 60. . . ." The results of patients treated from 1910 to 1912 give on the whole an average of 50 to 51 per cent. cases of recovery. And every year the results will improve as we get more and more patients in the early stage.

To sum up, in considering the treatment of pulmonary tuberculosis we must bear in mind two opposite facts. Nature can cure her consumptive children without man's

assistance, and all man's resources will be of no avail if Nature fails with her help. Without any exaggeration, and looking merely at the results of many years' treatment, I can say that in the (*a*), (*b*), (*c*) method of treatment we have a sure and certain means of saving a great majority of early cases of consumption. The combined treatment is a carefully worked out system, takes the patient step by step, lays a good foundation by raising the resisting power by fresh air, food and rest, helps to create a natural immunity by graduated exercises, arrests the morbid activity of bacterial organisms and their toxins by continuous inhalation which is simple, can be used at all times, incurs no risk, and can be carried out at home with advantage if a sanatorium is not available. Just as on a battlefield, it is not all artillery or infantry or cavalry, but all the forces united together and planned and directed by wise generalship that wins the day, so it is the combined system of fresh air, rest, exercises, and inhalation, supervised and controlled by an experienced physician, that holds out the best prospect of conquering the disease in a large number of early cases. If this system fails it is either because the patient has not carried out the treatment conscientiously or his vital powers were too low for Nature to respond to the means employed.

In conclusion, I should like to raise a note of warning in reference to the recent national provision of sanatoriums in England. Nature knows no short cut to the cure of consumption. All attempts to treat the disease by cheap and quick methods will prove expensive in the long run. While palatial buildings and expensive sanatoriums are a mistake, the tendency to run cheap sanatoriums with cheap buildings and cheap food is equally wrong, and will bring discredit to the whole sanatorium movement. Nature cannot be hustled or bullied. It is better to leave the consumptive alone than use half-measures. For it is well known that patients live longer when they are left alone than when they are partially patched up by sanatorium treatment.

DISCUSSION.

Dr. WILLCOX said that in some cases of pulmonary tuberculosis the use of antiseptic inhalations was beneficial. It was valuable in the very early cases when combined with the usual methods of treatment, and also it was useful in advanced cases with much expectoration. He referred to the valuable work done by Dr. David Lees on this subject. If the method of treatment by antiseptic inhalation was to be carried out successfully it was necessary for the inhaler to be used continuously and for the antiseptic to be added at frequent intervals. There was need of some simple form of apparatus whereby the antiseptic inhalant could be automatically added.

FURTHER INVESTIGATIONS OF THE ACTION OF DIGITALIS ON THE BLOOD PRESSURE IN MAN.

By FREDERICK W. PRICE, M.D., M.R.C.P.,

Physician to the Great Northern Hospital; late Physician to the Mount Vernon Hospital.

AT the annual meeting of last year, before the Section of Pharmacology and Therapeutics, I read a paper, which appeared in the BRITISH MEDICAL JOURNAL of September 21st, 1912, entitled "Some Investigations of the Action of Digitalis on the Blood Pressure in Man." The paper was based upon investigations conducted at the bedside at the Mount Vernon Hospital for Diseases of the Chest, and it referred to 21 cases of heart disease. In regard to the first 16 of these cases the blood-pressure measurements were part of a series of investigations on 40 cases of heart disease and 3 cases of pulmonary tuberculosis, dealing in detail with the action of the digitalis series of drugs on the cardio-vascular system in man, in which I was associated with Dr. James Mackenzie, Professor Cushny, and others, during a period of two or three years.*

The reason why I referred to only 16 of the 43 cases was that, except in the early stages of our investigations, the blood-pressure observations were confined to cases with a regular heart action, or with only an occasional irregularity—that is, where there are periods of regularity of sufficient length during which to take measurements. In hearts with a completely irregular rhythm—in other words, in cases of auricular fibrillation, where there is a constant variation in the strength of the pulse-beats and the beats come through in an irregular fashion—it is impossible to get a figure which actually represents the condition. It will be well to tell you some other points in regard to the methods of investigation of these 16 cases. All the patients were first of all given a course of rest before any drug was administered. This plan prevented any drug being credited with results which were in reality due to adventitious circumstances. The sphygmomanometer used was Martin's modification of the Riva-Rocci. Only the systolic pressure was taken, for, in our opinion, it is not certain that as yet we have a method of accurately determining the diastolic pressure. The measurements were taken either every day or nearly every day. In regard to dosage, as a rule we gave a drachm, but sometimes 45 minims, of the tincture of digitalis per day. The cases were 7 cases of mitral disease, 1 case of mitral disease with also a systolic murmur over the sternum, 1 case of cardio-sclerosis, 4 cases of double aortic and mitral systolic bruit, and 2 cases of double mitral and double aortic disease. In all excepting 5 cases there was no observable change in the blood pressure during the administration of the drug. Of these 5 cases, in 3 there was a fall equal to about 20 mm. of mercury towards the end of the period of administration (in 1 of these cases the fall remained after the drug was stopped); in 1 there was probably a fall; and in 1 there was a rise equal to about 20 mm.—namely, in a case of double aortic disease with also a mitral systolic murmur, arterial wall thick and somewhat tortuous, cyanosis, orthopnoea, slight jaundice, much oedema, and slight albuminuria, and with a blood pressure varying between 170 and 180 mm. So much for these 16 cases.

It seemed to me that the matter was of such practical importance that I decided to extend these observations, and since then I have conducted clinical investigations on the general subject of blood pressure. I have tried to eliminate all possible sources of error. This is most important in investigations of this kind. The measurements were taken either by myself or by a few individuals with whose results I have repeatedly compared my own and always found them to be the same. They were almost invariably taken each day, and always at the same time of day. Excepting on a few occasions, the patients were confined to bed throughout the observations, and lived under exactly the same conditions when they were taking the drug as when they were not taking it. In each individual case the same instrument was used throughout. As previously, Martin's modification of the Riva-Rocci was employed, the systolic pressure only was dealt with, and the measurements were confined to cases with a regular heart action or with only an occasional irregularity. In some cases observations were taken over prolonged periods, even up to five months.

The same dosage of tincture of digitalis was used. In some cases I gave only one course of the drug, in others two, and in one case three courses. I described 5 cases in my last paper. They were: (1) A labourer, 52 years of age, with arterio-cardio-sclerosis, a considerable degree of thickening of wall of radial artery, a moderately enlarged heart, and an average pressure of 152 mm. Three courses of the drug were given. (2) A carpenter, 36 years of age, with mitral incompetence, hypertrophy of the left ventricle, and an average pressure of 147 mm. Two courses of the drug were administered. (3) A bricklayer, 59 years of age, with angina pectoris, wall of radial artery considerably thickened and tortuous, and average pressure of 111 mm. One course of the drug was given. (4) A carman, 37 years of age, with angina pectoris; on examination of the cardio-vascular system nothing abnormal was detected (though *post-mortem* examination revealed extensive syphilitic aortitis, the cusps of the aortic valve having escaped, and gummatous changes in the myocardium), and an average pressure of 120 mm. One course of the drug was administered. (5) A man, formerly a machinist, 45 years of age, with pulsus alternans, auricular flutter, mitral

* For some of the practical results of these general investigations see a short paper in the BRITISH MEDICAL JOURNAL of October 7th, 1911.

Table Showing the Action of Digitalis on the Blood Pressure.

	Blood Pressure in Millimetres of Mercury (Measurements taken on Consecutive Days).																									Averages.		
																										Before Drug.	During Drug.	After Drug.
Case I ...	125	135	125	132	120	132	135	138	138	130	125	145	125	140	145	140	145	145	145	145	150	140	145	145	140	145	136	141	142
Case II ...	120	115	125	125	115	115	120	118	124	115	125	115	125	115	115	120	118	120	125	130	125	135	135	135	125	132	119	119	131
Case III ...	180	180	165	160	170	180	180	180	180	175	180	185	170	180	180	180	182	180	170	175	172	160	200	190	190	185	179	176	180
Case IV ...	110	110	112	115	115	110	108	110	125	112	113	118	125	130	125	125	120	125	115	115	125	120	122	125	123	122	113	120	122
Case V ...	130	154	136	140	140	140	140	130	160	140	138	146	130	142	126	130	134	134	136	138	134	132	140	136	138	138	140	137	137
Case VI ...	122	128	136	136	130	130	132	134	128	128	130	124	124	124	132	114	120	124	120	124	110	120	120	132	102	130	130	126	119
Case VII ...	130	130	118	104	116	110	112	106	110	118	102	110	118	128	124	112	108	112	112	114	120	114	116	112	106	120	117	114	116
Case VIII ...	112	112	112	112	112	120	118	114	118	118	108	116	110	112	116	110	110	104	100	114	106	114	100	100	116	120	112	112	110
Case IX ...	94	120	100	112	120	120	110	110	110	114	108	108	108	—	—	—	—	—	—	—	—	—	—	—	—	—	111	110	—
Case X ...	150	138	116	126	120	124	138	120	114	104	130	124	112	124	116	100	128	118	138	—	—	—	—	—	—	—	129	120	121
Case XI ...	108	116	108	112	116	108	120	112	108	110	126	110	118	120	126	114	112	112	114	—	—	—	—	—	—	—	111	115	116

NOTE.—It has not been possible to give all the measurements, but selections have been made from each case to show the blood pressure before digitalis was administered, while the drug was being taken, and after. The averages do not relate to the figures here given, but to the whole of the measurements taken. The smaller figures indicate the measurements while the patients were taking the drug.

stenosis, and enlarged heart; the pressure varying from 132 to 146 mm. One course of the drug was given. In none of these cases was there a rise of blood pressure during the administration of the drug; indeed, in the third case there was possibly a fall.

Having investigated those cases which exhibited some cardio-vascular disease, I thought it advisable to turn my attention to cases in which the rate and rhythm of the pulse were normal, the wall of the radial artery not unduly palpable, and on examination of the heart nothing abnormal detected; and to-day I wish to bring before you the results of observations of 11 cases. Blood-pressure measurements were taken daily, and at the same time of day. Fifteen minims of tincture of digitalis were given three times a day, usually until some definite reaction was obtained.

The first four are cases of apyrexial pulmonary tuberculosis, admitted to the Mount Vernon Hospital for Diseases of the Chest. The samples of digitalis used were obtained from the hospital dispensary, since previous specimens tested at the University College Pharmacological Laboratory proved wonderfully constant in strength.

The other cases were under observation in the wards of the West End Hospital for Diseases of the Nervous System. The samples of digitalis used were obtained from Messrs. Wallas and Co., New Cavendish Street, W., and had been physiologically standardized at the Physiological Laboratory of the University of Liverpool.

CASE I.—W. H., an ex-soldier, 30 years of age. Measurements were taken for fifty-four days. The pressure usually varied from 125 to 145 mm., the average being 140 mm. Two courses of the drug were given, the first for eight days, the second for thirteen days.

CASE II.—A. G., male, a fruit picker, 31 years of age. Measurements were taken for twenty-eight days. The pressure usually varied from 115 to 135 mm., the average being 125 mm. One course of the drug was administered for ten days.

CASE III.—T. P., male, a groom, 30 years of age. Measurements were taken for sixty-three days. The pressure usually varied from 175 to 185 mm., the average being 178 mm. Three courses of the drug were administered, the first for eight days, the second for eight days, and the third for nine days. (A short course of four days has not been taken into account.)

CASE IV.—N. M., male, an artesian well engineer, 31 years of age. Measurements were taken for twenty-nine days. The pressure usually varied from 110 to 125 mm., the average being 118 mm. One course of the drug was given for eleven days.

CASE V.—W. B., male, a stoker, 42 years of age. Measurements were taken for twenty-seven days. The pressure usually varied from 130 to 140 mm., the average being 138 mm. One course of the drug was given for fourteen days.

CASE VI.—A. M., female, of no occupation, 17 years of age. Measurements were taken for twenty-seven days. The pressure usually varied from 120 to 130 mm., the average being 125 mm. One course of the drug was administered for fourteen days.

CASE VII.—W. T., female, a clerk, 26 years of age. Measurements were taken for twenty-seven days. The pressure usually varied from 110 to 120 mm., the average being 116 mm. One course of the drug was given for fourteen days.

CASE VIII.—R. W., female, married, 42 years of age. Measurements were taken for twenty-six days. The pressure usually varied from 110 to 120 mm., the average being 111 mm. One course of the drug was administered for fourteen days.

CASE IX.—J. C., female, no occupation, 17 years of age. Measurements were taken for thirteen days. The pressure usually varied from 108 to 120 mm., the average being 110 mm. One course of the drug was given for six days.

CASE X.—E. P., female, married, 50 years of age. Measurements were taken for nineteen days. The pressure usually varied from 104 to 138 mm., the average being 123 mm. One course of the drug was administered for seven days.

CASE XI.—E. H., male, a boiler maker, 34 years of age. Measurements were taken for nineteen days. The pressure usually varied from 108 to 126 mm., the average being 114 mm. One course of the drug was given for seven days.

Turning to the results of these 11 cases, in none was there an appreciable rise of the systolic blood pressure during the administration of the drug. In order to make quite certain of this I have worked out averages and compared them.

Let me now summarize the results of all the investigations.

In all 37 cases have been observed. Of these, 26 were cases exhibiting some cardio-vascular affection, including arterio-sclerosis, myocardial degeneration, and valvular disease (mitral and aortic), the systolic blood pressure in some of these being subnormal, in others normal, and in others supernormal; 11 were cases in which on examination of the radial artery and heart nothing abnormal was found. I submit that the methods of investigation were adequate and accurate, and that a definite conclusion is warranted.

In only one case was there a rise in blood pressure, in several there was a fall, and in the remaining cases there was no observable change. I do not suggest that the fall was due to the administration of the drug.

One very important point has emerged from my investigations—namely, that in a considerable percentage of cases considerable fluctuations in the systolic blood pressure occur from day to day. There is no doubt about this. I am not now referring to the variations associated with meals, physical exertion, or mental states, but to diurnal variations which appear to be quite independent of these. In one case the variations amounted to 26 mm. of mercury.

Now, if in by no means a small proportion of cases there may be considerable normal fluctuations from day to day, we should be very careful in coming to conclusions in regard to the action of drugs on the blood pressure in man. It should never be forgotten that any changes observed during or after the administration of a drug in disease may be due to the natural course of the malady.

Taking these two facts into consideration—namely, (1) that in only one case was there a rise in blood pressure,

while in several cases there was a *fall* of pressure, and in the remaining there was no change; and (2) that not infrequently a normal diurnal variation of considerable range occurs—I think we must say that, so far as these cases are concerned, the internal administration of digitalis does not raise the blood pressure in man by constricting the peripheral vessels. This is directly contrary to the belief which has hitherto been held without questioning by the profession at large, and the view which is found in the textbooks of pharmacology and therapeutics, and is taught in the medical schools.

Upon what evidence has the belief rested? So far as I can discover from the literature of the subject, with the exception of Sir Lauder Brunton's observations by means of the sphygmograph upon himself, the belief has rested entirely upon experiments upon animals, and animals which were in normal health.

Now, as I have pointed out before, although it may be proved that a particular drug has a certain action on an animal, especially a healthy animal, it does not necessarily follow that it has the same action on a human being, especially with a diseased condition. The experimentalist, in order usually to get his result within a few hours, usually employs extremely large doses. Also, the reaction of a drug is influenced by the nature of the lesion. Furthermore, in regard to blood pressure we should remember that in man, in order that the upright posture may be maintained, the vaso-constrictor mechanism is much more perfect than in the lower animals. Anyhow, I submit that these investigations go to prove that, judged by the methods in use for observing the blood pressure clinically, the internal administration of digitalis does not raise the blood pressure in man by constricting the peripheral vessels. Hitherto therapeutists have been afraid of administering the drug in cases of cardiac failure in which there is extensive degeneration of the arterial coats, for fear of rupture of their walls and apoplexy, or where cardiac dilatation is associated with increased arterial tension from disease of the arterial coats and of the kidneys. Some have tried to get over the difficulty by prescribing along with digitalis some appressor, such as sodium nitrite or nitro-glycerine, in order to dilate the vessels and lessen the arterial tension. It should not be forgotten, however, that the effects of appressors are but transient, while the rise in the peripheral resistance—if it is brought about by digitalis—is practically continuous. Others employ strophanthus instead in these cases, because of the prevailing view that it constricts the peripheral vessels less or not at all. But if digitalis does not raise the blood pressure in man by constricting the peripheral vessels, there is no risk in administering the drug in cases of degeneration of the walls of the blood vessels or of supernormal blood pressure. The point is of great practical importance, and it is because of this that I venture to lay before the profession the results of these investigations.

Records of the measurements of the 11 cases are appended (see table on previous page).

I wish to express my most cordial thanks to my late colleagues at the Mount Vernon Hospital; to Drs. Harry Campbell, Frederick Palmer, and Purves Stewart for kindly allowing me to make observations on their patients; and to Drs. Linnell, Shinnie, and Kimbell, and Mr. Hewitt Jones for much assistance in these investigations.

A CHAIR of Medical History has been established in the University of Siena. Dr. Domenico Bartuzzi, President of the Italian Society for the Critical History of the Medical and Natural Sciences, has been appointed professor.

THE fourth Congress of the International Surgical Society will be held at New York in April, 1914 (14th to 18th), under the presidency of Professor A. Depage, of Brussels. The following questions are proposed for discussion: (1) Gastric and duodenal ulcer (reporters, Sir Berkeley Moynihan and Drs. de Quervain, Hartmann, Lecène, Mayo, and Payr). (2) Grafts and transplantations (reporters, Drs. Carrel, Lexer, Morestin, Ulmann, and Villard). (3) Technique of amputations (reporters, Drs. Binnie, Ceci, Durand, Kuzmik, Ranzi, and Witzel). In connexion with this discussion there will be an exposition of artificial limbs. All communications relative to the congress should be addressed to Dr. Ch. Willems, President of the International Committee, 6, Place St. Michel, Ghent; or to Dr. L. Mayer, 72, rue de la Loi, Brussels.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

STRANGULATED HERNIA IN AN INFANT.

I WOULD like to add another to the cases of strangulated hernia in young infants recorded by Dr. Nichols and and Messrs. Dent and Nance. The mother, a primipara, was confined on May 8th, 1912, forceps being used with light chloroform anaesthesia; the child was a vigorous male about 9 lb. weight. A fortnight later it developed acute eczema, which speedily became general, and caused great irritation. On May 30th the mother noticed a swelling in the right scrotum. Next day, as the bowels had not moved for thirty hours and vomiting had set in, and the swelling could not be reduced by taxis, the infant, then aged 3 weeks, was removed to the Parramatta Hospital. Under chloroform I cut down on the sac of a right strangulated inguinal hernia containing a loop of small intestine. The bowel was very dark but fit to return. The sac contained ½ oz. of dark turbid fluid. The neck of the sac was incised, the bowel returned, and the neck ligatured with catgut, the edges of aponeurosis being brought together with three chromic gut sutures. The skin was sutured with horsehair and painted with collodion, and dressed with a pad of wool. In spite of the skin being in a state of acute eczema the wound healed by first intention (no preparation of the skin before operation was attempted at all), and the eczema cleared up in about ten days from the operation under the application of calamine lotion.

Two points are worth noting: (1) The strangulation was probably caused by the straining induced by the constant crying from the irritation of the eczema. The bowel was forced through an almost closed neck into a sac which had not yet undergone obliteration, hence the strangulation. (2) In spite of the eczema and the absence of preparation of the skin, the wound healed by first intention. Any application of biniodide lotion or iodine to the skin would have been folly.

E. CUTHBERT HALL, M.D., M.S.Syd.

Parramatta, Australia.

THE MOUTH IN MEASLES.

IN spite of the number of deaths from measles, and of the more serious light in which it has come to be regarded by medical men to-day, lay tradition for the most part looks upon measles as a trifling disorder. And one cannot but be struck by the simultaneous occurrence in every epidemic of cases presenting, on the one hand, an illness of the most trifling character, and upon the other a condition placing the patient in grave danger of his life.

Of the causative factor we are yet ignorant, but a necropsy upon a fatal case always reveals to the bacteriologist the presence of one or more pathogenic micro-organisms, not, indeed, constant in variety, but notably the pneumococcus, the streptococcus, and the *Staphylococcus pyogenes aureus*.

It is submitted that measles is a condition in which certain tissues (notably mucous surfaces such as of the respiratory and alimentary tracts) are so affected as to render them unduly susceptible to the mischief which these organisms are able to bring about; and that herein lies the danger of the disease.

I contend that the first point of entry of these micro-organisms is the mouth, and in support of this submit that, in my experience: (1) Every case of measles with severe complications (whether of bronchopneumonia or diarrhoea) has presented a mouth of exceeding foulness; (2) among my patients, since the adoption of routine cleansing of the mouth, no case brought under treatment within twenty-four hours of the appearance of the rash has had a fatal termination.

The treatment adopted is simply to order the mother or nurse to wipe out the mouth carefully but gently every four hours with a piece of clean boiled rag or lint dipped in borax or thymo-glycerine; attention is directed not only to the tongue and roof of the mouth, but especially to the inside of the cheeks and labial surface of the gums.

I claim nothing new for this method; it finds mention, among other details, in every textbook and system of medicine. But from the number of instances (both in

consultation and in conversation with other medical men) in which it would seem that this simple piece of therapeutics has been omitted, it has seemed well to set down that which I have come to regard as the most important detail in the treatment of measles, the disregard of which produces results as unhappy as they are avoidable.

St. Columb. J. R. R. TRIST.

THE ETIOLOGY OF BERI-BERI.

IN connexion with the recent memoranda on this subject, I wish to add my testimony to those who hold that the etiology of beri-beri is still unsolved. I have had a unique opportunity of studying this disease during an epidemic on board a survey ship carrying a native crew of over a hundred, and I can state definitely that diet had nothing to do with the spread of the disease. Of the warrant officers' mess the assistant surgeon and of the officers' mess I myself were the only members that contracted the disease; of the native crew about half suffered.

In this outbreak there were many factors indicating the infectiousness of the disease, but time forbids my giving details here. Exponents of the food-deficiency theory have proved that multiple neuritis may result from sins of omission as well as from sins of commission, but they have assumed, not proved, that the multiple neuritis arising from sins of omission is beri-beri.

One instance alone of beri-beri occurring where no fault in diet can be found, or on a diet known to be incapable of producing multiple neuritis, is sufficient to overthrow the deficiency theory, if beri-beri is a clinical entity. Now many such instances are being reported from different countries. We must conclude either that beri-beri is not a clinical entity, or that the food-deficiency theory is wrong.

Personally, I look upon beri-beri as a clinical entity and an infectious disease; and I believe that an examination of the gastric contents by a skilled mycologist will reveal the true cause of the disease. The infectiousness being of a low order, a large dose of concentrated virus is required, such as can be obtained only under conditions of overcrowding. Under good hygienic conditions beri-beri is practically unknown.

A. C. MACGILCHRIST, M.D., D.Sc., M.R.C.P.,
Bengal. Major, I.M.S.

TORSION OF THE TESTICULAR CORD.

THE following case is of interest from the fact that the treatment adopted was not one which I have ever seen suggested in works on surgery.

About 11.30 one night I was called out to see a young officer who was complaining of severe pain in the left testicle and vomiting. He stated that he had suffered from an undescended testicle on the left side as a boy. On two previous occasions he had suffered from similar attacks of pain in the organ which had, however, recovered spontaneously in a few hours.

The present attack had begun suddenly while the patient was dining, and he was forced to retire to his tent, where he vomited several times. When I saw him his left testicle and cord were swollen and tender, his temperature was 97° F., and his pulse 100. A diagnosis of torsion of the testicle was made, but in view of the facts that from his history similar attacks had been recovered from, and that he would have to travel seven miles to obtain suitable conditions for operation, I at first tried palliative measures. These failed. The vomiting persisted, and the testis became more painful.

Before finally sending him to hospital manipulation was tried. Twisting the organ outwards increased the pain, so that it was rotated inwards, and after passing through nearly 180 degrees it suddenly "reduced" with a jerk not unlike that felt on reducing a dislocation. The patient experienced almost immediate relief, and beyond a slight local effusion felt quite well the next morning.

C. M. FINNY, M.B.,
Barian, Punjab. Lieutenant, R.A.M.C.

THE late Professor Francis Gotch, F.R.S., left estate of the gross value of £19,928, of which the net personalty has been sworn at £18,621.

THE Treasurer of the Society of Medical Phonographers has forwarded a donation of £7 7s. to the Royal Medical Foundation of Epsom College.

Reports
ON
MEDICAL AND SURGICAL PRACTICE IN HOSPITALS AND ASYLUMS.

ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE.

A CASE OF PARALYTIC ILEUS TREATED WITH PERISTALTIC HORMONAL.

(Under the care of Professor RANKEN LYLE.)

[Reported by J. C. YOUNG, M.B., B.S., House-Surgeon, and T. A. HINDMARSH, M.B., B.S., late House-Surgeon to Gynacological and Skin Departments.]

THE patient, E. G., a married woman, aged 50, no children, was admitted to the Royal Victoria Infirmary on April 7th, 1913. She was suffering from a large impacted cervical fibroid; the bladder was greatly distended and there were symptoms of cystitis. The bowels were obstinately constipated.

Total hysterectomy was performed by Professor Ranken Lyle on April 14th. Owing to the tight impaction of the tumour and numerous adhesions, the operation was very difficult. On the day following the operation the temperature was 100.4°.

On April 16th the patient vomited several times, the abdomen was becoming distended, and there were signs of diffuse post-anaesthetic bronchitis. As there was evidently commencing peritonitis, vigorous measures (calomel, enemata, etc.) were taken to procure evacuation of the bowels, but without success.

On the two following days (April 17th and 18th) vomiting was frequent. The vomited matter consisted of dark brown fluid. The belly was becoming more distended, and there was marked tenderness with slight rigidity of the lower abdomen.

On April 19th the bowels were still constipated, and no flatus had been passed since the operation. Vomiting was copious and persistent. The temperature was 101° and the pulse 144. At 11 a.m. 20 c.cm. of peristaltic hormonal (as suggested by Dr. Zuelzer of Berlin) were injected intravenously. When 10 c.cm. had been slowly run in, the patient complained of pain in the head; her pupils became dilated, her pulse almost disappeared, and she became markedly cyanosed. She quickly passed into a practically unconscious condition. The injection was hurriedly completed, and 1 c.cm. of pituitary extract and $\frac{1}{20}$ gr. of strychnine were then injected into the same vein. After about two minutes the cyanosis disappeared and the patient rallied. Before the full quantity (20 c.cm.) had been injected there was a very audible passage of flatus; five hours after the injection a copious motion was passed, and this was repeated thrice later in the day.

On the day following injection (April 20th) the patient's general condition was much improved; the pulse was reduced to 120 and the temperature to 98.4°; the abdominal distension was much less marked, and she passed several more motions with free escape of flatus. Vomiting had not occurred since the injection.

On April 21st the chest condition, unfortunately, became much worse. The bowels, however, continued to act freely, and the distension had almost disappeared. Rigidity and tenderness were very slight. On April 22nd the chest condition gradually became worse, and the patient died on the evening of April 23rd, the bowels having continued to act frequently up till six hours previous to death.

Post-mortem Examination.—There was diffuse bronchitis and oedema of the lungs, with patches of bronchopneumonia at the bases. There was definite pelvic peritonitis, and several coils of small intestine lying in the pelvis were covered with lymph. One or two small pockets of pus were also found. The action of the hormonal in overcoming the paralysis and distension due to the peritonitis was completely satisfactory. The dangerous symptoms immediately following the injection gave rise to considerable anxiety, and seem to be the only drawback to the use of the drug. These symptoms—fall of blood pressure, etc., due presumably to vaso-dilatins—were successfully combated by the vaso-constrictor action of the pituitary extract and by the strychnine.

We have to thank Professor Ranken Lyle, under whose care the patient was, for permission to publish these notes.

Reviews.

SURGERY.

In the preface to the bulky volume, entitled *Thérapeutique Chirurgicale*,[1] by Professor PHOCAS and Dr. BAROZZI, we find that the first edition, comparatively small in size, has been long out of print, and we cannot wonder when we consider that twelve years have passed since its issue. Surgery has expanded enormously during the last decade, and it is a matter of great difficulty for practitioners to keep pace. This volume is intended to be a book of reference mainly on surgical treatment, and especially the surgery likely to be met with in everyday practice. It is divided into three main portions. The first deals with generalities, such as sterilization, haemostasis, anaesthesia, amputations; the second with diseases of the tissues; and the third with diseases of regions. Each section contains a short preliminary statement of pathology and symptomatology before proceeding to details of therapy. An examination of the treatment advised in many diseases shows that in all instances the recommendations are practical and fairly modern. There is really no difficulty which might present itself to the busy practitioner, to whom the book is addressed, for which a solution of some sort is not given. But we have to admit that there often is difficulty in finding what we seek. There are three indexes, and what ought to be the chief, the ordinary alphabetical index, is sadly wanting in fullness. One index is the list of authors quoted, but its value is seriously diminished by inaccuracies in spelling of well known English, American, and even French names. The book is too big, and its size might be diminished without any real loss to the reader were all matter which is out of date rigorously expunged. The Macewen operation (this is one of the proper names the author misspells, but it has always been a difficult one for the Frenchman) of osteotomy is mildly condemned because it is a "blind" operation, forgetful of its sound anatomical basis. In dealing with this rickety deformity the authors commend manual osteoclasia reintroduced by Italian surgeons. We are relieved to know, however, that Professor Kirmisson in his recent work regards osteotomy after the Macewen method as greatly to be preferred to osteoclasia and uniformly successful in his hands. In discussing prostatectomy premier place is given to the perineal operation, which is very fully described and illustrated. The suprapubic operation is not well described, and the authors' recommendation is to employ perineal drainage along with it. The work of English surgeons in this department hardly receives its due appreciation. Indeed, this criticism may be made of the whole book, that the authors are scarcely cosmopolitan enough, but they may think that as the work is for their own countrymen there is little need to go further afield.

It is only about a year ago that we noticed favourably the volume of the London Medical Publications on *Minor Surgery*.[2] The second edition has been greatly enlarged and discreetly revised. The lamented death of the author, Mr. LEONARD A. BIDWELL, as the new edition was passing through the press necessitated the final proof reading being delegated to Mr. Percy Dunn, but the work is now presented to the profession exactly as it was completed by Mr. Bidwell. We may say at once that it is greatly improved. It is larger but lighter, and its scope is wider. The area of minor surgery is broadening, and there seems no good reason to exclude from this category any operation or surgical procedure which may be carried out in the dispensary or outdoor department of a hospital. For example, children, provided they can be seen frequently, may be operated on for hernia as outdoor cases. However, in this volume the operations of suprapubic cystotomy and opening of appendicular abscess are described, and the inclusion of these operations appears to us to widen beyond reasonable limits the range of minor surgery. Prompt minor surgery smartly done and neatly dressed appeals to patients; they do not stop to find out whether the lesion is minor to the doctor; it is for the moment major to them. And if they are roughly handled and the dressing is slovenly, they know it and tell their friends. The practitioner will find much pleasure in reading this book, and he will profit the more he studies it, for in it he will find guidance in the use of old methods, and many suggestions fer efficient employment of the new.

In 1896 Mr. A. ERNEST MAYLARD published a treatise on the surgery of the alimentary canal; it was largely a compilation to show the advance made in abdominal surgery. It is now followed by a volume entitled, *Practice and Problem in Abdominal Surgery*.[3] Mr. Maylard announces in the preface that it is not intended to be a treatise on abdominal surgery, but is the outcome of his own experience since 1880. Chapters I, II, and III deal with abdominal pain, and contain general remarks and discussion on the difficulties in diagnosis and prognosis. His technique and procedure are a combination of new and old methods; he sterilizes his hands by soaking in hot water for ten minutes, then soaking in 1 in 20 carbolic; he prefers this to using gloves; he no longer uses iodine for the patient's skin, but 1 in 20 carbolic, except in cases of acute appendicitis. He makes transverse incisions unless speed is essential, adheres to catgut for both sutures and ligatures, and prefers gauze pads rather than sponges. He nearly always gives ¼ grain morphine immediately after the operation, and recommends four weeks in bed for clean and six for suppurating cases. Chapter IV is devoted to hernia; he has no experience of wire filigree. In Chapter VI peritoneal adhesions are discussed. Over 100 pages are given to conditions of and operations on the stomach; for perforated gastric ulcer he prefers to close the ulcer and wait and do a gastro-jejunostomy later if necessary; he performs Finney's gastro-duodenostomy or the no-loop gastro-jejunostomy for pyloric obstruction. He finds that the majority of cases of carcinoma of the stomach are not suitable for laparotomy; whenever possible he performs subtotal gastrectomy. Chapter XVI is on chronic intestinal obstruction; he performs intestinal anastomosis by invagination. Chapter XIX deals with cholelithiasis; he is in favour of cholecystectomy. The last chapter recommends a revised nomenclature for operations on the abdominal viscera. The book is mainly composed of short accounts of symptoms and pathology, with a discussion on the various treatments and descriptions of those the author prefers, illustrated by accounts of cases. It would be far easier to read if the cases were printed in different type and separated from the text. The book is a practical account of over thirty years' experience, and, though parts of the work may be described as old-fashioned, it can be recommended to those desirous of following one man's experience.

In *A Student's Manual of Surgical Diagnosis*[4] Dr. G. E. BREWER impresses on the student the importance of diagnosis by exclusion. The book consists of 40 pages. Sixteen of these are charts of surgical lesions based on anatomy and pathology. Six cases are described, with differential diagnosis. No account is given of how histories should be taken or examinations conducted. Diagnosis is to be arrived at by a comparison of cases with the charts and other conditions excluded. Some of the charts contain over fifty lesions. We do not think the book can be recommended.

The authors of a short German monograph[5] on surgical technique in normal and pathological physiology of the intestinal tract, Professor BICKEL and Dr. KATSCH, state that much of the operative work done in the laboratories is not known because it is hidden away in all sorts of published transactions, and is not available for ready

[1] *Thérapeutique chirurgicale et chirurgie journalière.* Par G. Phocas, Professeur de clinique chirurgicale à la Faculté de Médecine d'Athènes, et J. Barozzi, Ancien Interne des Hôpitaux de Paris. Second Edition. Paris: Vigot Frères. 1912. (Sup. roy. 8vo, pp. 1187; 630 figures. Fr. 16.)

[2] *Minor Surgery.* By Leonard A. Bidwell, F.R.C.S. Second edition, revised and enlarged. London Medical Publications. London: University of London Press: Hodder and Stoughton and Henry Frowde. 1913. (Demy 8vo, pp. 316; 129 figures. 10s. 6d. net.)

[3] *Practice and Problem in Abdominal Surgery.* By A. E. Maylard, B.S.Lond. London: J. and A. Churchill. 1913. (Demy 8vo; 38 figures. 8s. 6d. net.)

[4] *A Student's Manual of Surgical Diagnosis.* By G. E. Brewer, M.D., New York. London: D. Appleton and Co. 1912. (Med. 8vo, pp. 40.)

[5] *Chirurgische Technik zur normalen und pathologischen Physiologie des Verdauungsapparates.* Von Dr. Adolf Bickel, a.o. Professor an der Universität, Berlin, etc., und Dr. Gerhardt Katsch, Assistant am städt. Krankenhaus, Altona, etc. Berlin: A. Hirschwald. 1912. (Roy. 8vo, pp. 120; 6 plates and numerous illustrations. Mk.12.)

reference. They have therefore put together in practical form all the known operative experiments with descriptions concise enough for completeness, and with illustrations numerous enough for easy comprehension. The work is in two parts, general and special. The general section is concerned with laboratory arrangements, preparation and after-treatment of the animals; while the special section describes in detail various groups of operations performed. It is of interest to know that general anaesthesia with ether, preceded by morphine and atropine by hypodermic injection, is found to give the best results, and is employed in every experiment. Needless to state, the strictest possible aseptic precautions are observed, and the manipulations are carried out precisely as for an abdominal operation in the human subject. The dogs are carefully nursed and tended after operation, each in its own cubicle; the arrangements are shown in a sketch plan for a small institute for physiological surgery. In the special part there is a full description of the various operations associated with the name of Pawlow and others of the St. Petersburg school, whose work on the gastric secretion by means of modified oesophagostomy and gastrostomy accompanied or not by vagotomy has elucidated so many obscure features of digestion. Then we find here also fully set forth the recent operations on the thoracic organs by means of the positive and negative pressure apparatus which are figured in the text. And lastly, we wish to note the method of performing the operation of establishing an Eck fistula or communication between the portal vein and the inferior vena cava, an operation suggested for the treatment of cirrhosis of the liver with ascites in the human being. This is a work which will be very valuable to those engaged in laboratory experimental surgery on animals. The operations are plainly described, and useful anatomical points are brought clearly to the front, evidently because these have presented difficulties to the authors themselves in their work. Physiological investigation is the main purpose of the book.

Professor GEBELE, in the preface to his textbook on methods of surgical examination,[6] says that in German surgical literature there is a distinct place for such a work. Most books of the kind indulge too freely in clinical description of diseases; for the temptations of an author to permit a work to expand are great, so that the original purpose may be lost sight of. Here we have a book which teaches systematic, painstaking methods in clinical surgery. The reader learns first how to inquire into personal and family history, then into the course of the present illness, and then to go from point to point through the various means at disposal for arriving at a diagnosis—inspection, palpation, puncture of cavities, and so on. There is a chapter also on the serum diagnosis of syphilis, tubercle, and echinococcus. Of the value of this means of investigating syphilis and tubercle there can be no doubt; but, on the author's admission, the method is of doubtful value in echinococcus disease, reactions occurring only in half the cases. The methods of using the oesophagoscope, gastroscope, and tracheoscope are quite reasonably described, with explanatory photographs. The employment of these instruments is only possible in expert hands, but no harm can come from students and practitioners being at least acquainted with such special methods of examination. The book is fully illustrated with many excellent photographs of cases from the clinic. We may well believe that it will thoroughly meet the wants of students of clinical surgery, whether they are still "walking the hospitals" or are working in the wider field of practice.

OPHTHALMOLOGY.

AMONG the volumes in "The Edinburgh Medical Series" is one on *Diseases and Injuries of the Eye*,[7] by Dr. W. G. SYM. It is of medium size, and is well illustrated with both black and white and coloured plates. The whole subject of ophthalmology is dealt with from the point of view of the requirements of the practitioner and student. The text is excellent, and the various chapters deal efficiently with the subjects of which they treat. Rather dogmatic statements are found on points which might be debated, but it is better for a student to be told what a thing is and what he ought to do for it than to be treated to a discussion of disputed points, which may leave him in doubt as to what he should do. It is rather unusual to find a chapter on the medico-legal aspect of eye conditions in a book of this sort, but it will be very useful in these days when so many cases of injury have to be considered from the point of view of compensation. Most of what is modern is alluded to, and the various new operations of Lagrange, Herbert, and Elliot are discussed when considering glaucoma. A curious mistake is to be noted on page 15 when dealing with the examination of the eye. Snellen's letters are being explained, and the author states that the normal measure of vision is that of an eye which can see a letter subtending an angle of 5″, while the individual parts of the letter each subtend an angle of 1″, and vision of this standard is called $\frac{5}{5}$. Such a statement makes one doubt whether the author has ever used a sextant, for even the best of these delicate instruments do not pretend to measure an angle of less than 10″, and many of them will not even do this, while the slightest touch of the vernier would induce an error of a great deal more than 10″. To see as two objects which subtend an angle of 1″ is absolutely beyond the power of any human eye. The angle which Snellen arranged for was one sixty times larger than this—namely, letters giving an angle of 5′, with parts giving an angle of 1′. We noticed in another well-known book a short time ago that the figures read 5° and 1°, but this is going to the opposite extreme with a vengeance. When different textbooks talk about degrees, minutes, and seconds, and all mean the same thing, it is about time authors took the trouble to ascertain and use the correct terms. There is a useful chapter on nursing, and a very short one on the visual requirements of some of the principal public services.

From Professor Gullstrand's eye hospital in Upsala we have received a monograph on the localization of foreign bodies in the orbit by the Roentgen rays for which Dr. K. G. HOLM[8] received the degree of M.D. He first reviews the primitive methods of detecting foreign bodies within the orbit used when the Roentgen rays were first introduced. Many improvements have since been made, and for much of this British workers, including Mackenzie Davidson, W. Lang, MacCallan, and Holmes Spicer, are responsible. The author does not, however, consider that any of the methods hitherto described are perfect, and he proceeds to give a detailed account of the modifications he has introduced. His description is illustrated by numerous drawings and photographs, and he reports in full 24 cases of foreign bodies in the orbit treated at Gullstrand's hospital.

It is ten years since the second edition of *Ophthalmic Nursing*[9] appeared, and the author, Mr. SYDNEY STEPHENSON, has now issued a third. It is a book very worthy of being brought up to date. A great many changes in treatment have taken place during the last decade. In general appearance the book is much like its predecessor, but it is a good deal fuller, and contains much new material, all of which has a very definite bearing on the nursing of eye cases. The arrangement is excellent, and every care has been taken to make the text clear and intelligible to those for whom it is intended. Its basis is some lectures given by the author to the nurses at the Ophthalmic School at Hanwell, now a good many years ago. The anatomy of the eye is first of all described, and then a brief but lucid description of the germ theory is followed by a chapter on its application to contagious and infectious diseases. In the subsequent pages dealing with the various stages of nursing stress is always laid on the why and wherefore of anything that a nurse has to do, so that she cannot be left in doubt about the various

[6] *Die chirurgischen Untersuchungs-methoden. Lehrbuch for Studierende und Aerzte.* Von Professor Dr. Hubert Gebele. München: J. F. Lehmann's Verlag. 1912. (Med. 8vo, pp. 198; 154 figures. Paper covers, Mk. 8; bound, Mk. 9.)

[7] *Diseases and Injuries of the Eye: a Textbook for Students and Practitioners.* By William George Sym, M.D., F.R.C.S.Edin. London: Adam and Charles Black. 1913. (Cr. 8vo, pp. 509; 87 figures, 25 plates. 7s. 6d. net.)

[8] *Om Bestämning af Främmande Kroppars Läge i Ögat och Orbita med Röntgenstraalar.* By K. G. Holm. Upsala: Almquist and Wiksells Boktrykeri. 1912. (Roy. 8vo, pp. 59; 7 tables, 3 plates.)

[9] *Ophthalmic Nursing.* By Sydney Stephenson, M.B., C.M. F.R.C.S.E., D.O.Oxon. Third edition. London: The Scientific Press, Ltd. 1912. (Post 8vo, pp. 243; 80 figures. 3s. 6d. net.)

manipulations she may have to perform. A detailed description is given of the method of preparing both the patient and the room in which the operation is to be performed, and directions are added for sterilizing the hands of the nurse and those who have anything to do with the operation. A brief account is given of the commoner operations of the eye and the method of examining troublesome children. The last chapter contains hints on school inspection and the treatment of refraction cases; and, finally, there is an appendix giving a list, with illustrations, of the principal instruments used in ophthalmic operations, as well as a glossary of ophthalmic terms. We cordially recommend the book to all ophthalmic nurses, and it may well be read and studied by any one who occasionally undertakes ophthalmic work, and especially by those who may find themselves without the assistance of a trained ophthalmic nurse.

PRACTICAL EXPERIENCE OF TUBERCULIN.

THE therapeutic employment of tuberculin has become so widespread of late years that conclusions may fairly be drawn from the results hitherto obtained. A report by Dr. F. M. POTTENGER,[10] who has had extended experience as director of a sanatorium in California, presents a good account of the whole subject of tuberculin treatment from the point of view of the clinical observer who is not biassed by excessive enthusiasm nor discouraged by occasional failure. The theories upon which the treatment is based must, of course, be studied with care by every one who would use the method intelligently, but there is no common agreement as to its precise mode of action, and the practice may be said to rest upon a shifting base, since further knowledge may materially alter present views. But practical results obtained by uniform methods are incontestable, and it is by examination of these that judgement must be formed. Thus, the various forms of reaction which may be trusted to indicate the presence of tubercle in the body, while subject to many variations, are nevertheless positive in so large a proportion of cases that reliance may generally be placed upon them. Dr. Pottenger, however, is not one who would place absolute trust in positive reactions, and would only use them as confirmatory of suspicions aroused by definite symptoms of a more familiar type. Like every other experienced clinician, he recognizes the vast importance of dealing with tuberculous infiltration while it still remains closed and uncomplicated by the presence of other microbes or toxins. A definite reaction indicates to him the presence of tuberculous antibodies, but his large experience has evidently taught him that the conditions which may interfere with reaction are so numerous that the evidence can only be relied upon if other indications are recognizable. The same strain of caution runs throughout the whole of the book, and it is clear that he regards tuberculin as a useful adjunct to general hygienic conduct, but not by any means as a specific which can operate for good under all conditions. That tuberculin increases the percentage of cures and shortens the duration of treatment are conclusions that may fairly be drawn from analysis of a very large number of cases. The evidence as to the duration of the "cure" is not so convincing, and in many instances it has been shown that relighting-up of the tuberculous process may take place in those who have been cured by tuberculin as well as in those who have obtained apparent relief by hygienic means alone. Dr. Pottenger's book may be described as a comprehensive textbook containing all available and trustworthy information on the theory and practice of tuberculin treatment leavened with a wholesome strain of common sense in the application of it.

THE PSYCHOLOGY OF THE CHILD.

DR. PINTNER'S translation of SCHULZE'S *Experimental Psychology and Pedagogy*[11] will, no doubt, be welcomed by all who are interested in the important subject with which it deals. The experimental investigation of the sensory, emotional, mental, and physical capacities of school children is as yet in its infancy, but no one who reads this book can have any doubt as to its immense possibilities. The time will no doubt come, although it can hardly be said to be yet in sight, when the classification of children in accordance with their general or special abilities will be a matter of course. At present the investigator has for the most part to content himself with a laborious testing of individual functions, the relation of which to one another and to the general ability of the subject remains quite problematic. "We can measure accurately the difference sensitivity for colours, the direction of our associations, the excellence of our memory, but where is the method that takes account of the fact that our soul is not a mere sum of difference sensitivities and reproduction tendencies? Where is the method that does justice to the soul as a whole?" At present the problem is being tentatively attacked by the attempt to discover relations between different functions, and it is found that, whereas between certain forms of ability—for example, writing, counting, and adding—a high degree of correlation exists, others, as spatial sensitivity and memory, appear to be independent or nearly so. A great part of the present volume is necessarily occupied by the description of apparatus and by mathematical and technical details. This naturally detracts in a measure from its readableness, but every page nevertheless bears evidence of the genially human standpoint of the author and his enthusiastic faith in the future of his science. The translation deserves high praise for its clearness and fluency.

INDUSTRIAL POISONING.

As Dr. LEGGE, who has issued a translation under the title, *Industrial Poisoning from Fumes, Gases, and Poisons of Manufacturing Processes*,[12] justly remarks, one of the apparent drawbacks to Professor RAMBOUSEK'S book is that forms of industrial poisoning are referred to in two or three different places in the text; but notwithstanding this drawback, there is a completeness in it which to some extent is a recompense for this defect. In the chapter on chemical industry the processes of manufacture are suitably described and many of them are illustrated, while the harmful effects upon the men on their exposure to chemical compounds—particularly those of organic chlorine constitution with which we in this country are not familiar—are appropriately depicted. The completeness of the description of the various manufacturing processes is not quite maintained throughout the book. It could hardly be expected that it should. The illuminating gas and coke industry is dealt with at considerable length. In the processes concerned there is always the possibility of the escape of CO_2. The chapter on the coal-tar industry is, medically speaking, thanks to the translator, one of the best in our language. The possibilities of aniline poisoning in its various manifestations, including cancer of the bladder in aniline workers, are fully discussed, and Rambousek reminds us that at first all tar colours were considered to be poisonous. From products of the triphenylmethane type containing arsenious acid the arsenic is now removed. To the possibility of inflammation of the cornea following exposure to methyl violet dust, and for which both it and basic aniline dyes are blamed, must be opposed the fact that methyl violet and auramine are used as antibactericidal agents in ophthalmic practice, but it must be remembered that for this purpose the compounds are used in the form of a weak solution.

An interesting account is given of lead smelting works in Germany and Austria-Hungary in which plumbism is extremely prevalent among the workmen, probably owing to frequent changes in the personnel; 52 cases out of a total of 400 men employed is a large percentage, but at Przibram, and also at Selmeczbanya in Hungary, considerable reductions have followed the introduction of hygienic measures. The manufacture of white lead by the old Dutch process is alluded to, but in Central Europe this

[10] *Tuberculin in Diagnosis and Treatment.* By Francis Marion Pottenger, A.M., M.D., LL.D., Medical Director of the Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. London: Henry Kimpton. 1913. (Medium 8vo, pp. 242; 35 illustrations. 12s. 6d. net.)

[11] *Experimental Psychology and Pedagogy.* By R. Schulze. Translated by R. Pintner, M.A., Ph.D. London: Geo. Allen and Co. 1912. (Demy 8vo. pp. 390: 314 illustrations. 15s. net.)

[12] *Industrial Poisoning from Fumes, Gases, and Poisons of Manufacturing Processes.* By Dr. J. Rambousek, Professor of Factory Hygiene, Prague. Translated and edited by Thomas M. Legge, M.D., D.P.H., H.M. Medical Inspector of Factories. London: Edward Arnold. 1913. (Demy 8vo, pp. 370; 59 figures. 12s. 6d. net.)

pigment is produced probably in larger quantities by the German or Austrian methods, in which acetic acid vapour and CO_2 from burning coke are led into a chamber in which strips of metallic lead are hanging. On the Continent, as in Great Britain, the amount of lead poisoning is proportional to the extent unskilled labour is made use of. In British factories the cases of plumbism formed only 6 per cent. among persons regularly employed, but 38 per cent. among casual workers.

The second part of the book is devoted to the symptoms and treatment of industrial poisoning. These are briefly detailed as occurring in particular industries. The symptomatology might be more complete than it is, but the size of the volume may be partly responsible for this deficiency.

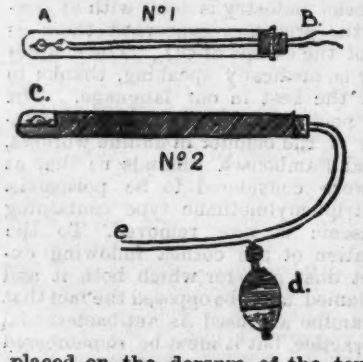
The remainder of the book deals with preventive measures—social and legislative. An interesting account is given of the origin and aims of the International Association for Labour Legislation and of the good work it has accomplished. This association is not known in Great Britain as it ought to be. Dr. Rambousek's experience does not lead him to expect any serious contribution to the elucidation of disease from the sick insurance societies. The inclusion of occupational disease in the same category as accidents for insurance purposes, as in France, Switerland, and Great Britain, has, he maintains, the advantage of removing many hardships.

Some of the regulations in force in various European countries for the reduction of industrial poisoning are given. As an indication of the wide reading of the author, it may be said that an excellent bibliography has been collected from the text by Dr. Legge, who pays a well-merited compliment to his sister Miss H. Edith Legge, not only for the part she has played in the translation of the book, but for her sustained interest throughout, which acted as a stimulus to her brother.

MEDICAL AND SURGICAL APPLIANCES.

An Inexpensive Transillumination Lamp.

Dr. E. Drybrough-Smith (Shebbear, N. Devon) writes: The following method of making an inexpensive transillumination lamp may be of service to those interested in diseases of the maxillary antrum and frontal sinus. Take an ordinary test tube, fit to it a cork; bore a hole in the cork. The end of a piece of twin silk-covered electric wire (of about 6 ft. in length) is passed through the cork. (Fig. 1 b.) A small electric "pea" lamp of six volts or more is now attached to the ends of the wire in the test tube. (Fig. 1 a.) Slip a piece of rubber drainage tubing over the test tube. Cut out a piece from the end of the tubing ½ in. long, leaving a flap projecting. (Fig. 2 c.)



One of the twin wires is now interrupted at a convenient distance from the test tube by the intervention of a small pear-shaped bell push which acts as a switch. The termination of the wires (Fig. 2 e) may be connected to any suitable source of electricity, such as an accumulator used for a cystoscope or a head lamp. The instrument is used in the usual way, the rubber flap being placed on the dorsum of the tongue. To examine the frontal sinus slip a piece of drainage tubing over the exposed end of the test tube; then the light will be directed forward in a suitable manner for examination of the frontal sinus. One of the special features of this instrument is the ease with which it can be sterilized. Remove the cork with its wire and lamp attached; the test tube with its rubber covering can then be boiled. My "pea" lamps cost about 6d. each, and the small bell push about 4½d. For the convenience of the reader I add that I believe these small things can be obtained from the Ever Ready Electric Company, Twickenham, London. The complete instrument did not cost me 1s. 6d.

The first Italian Congress of Medical Radiology will be held at Milan on October 12th and 13th. Dr. L. Parola is the President of the Organizing Committee.

LONDON WATER.

The seventh annual report of Dr. A. C. Houston, Director of Water Examination, Metropolitan Water Board, on the results of the chemical and bacteriological examination of the London waters for the twelve months ended March 31st, 1913, has just been issued. The results are carefully tabulated, and the document is full of interesting details. In his introduction Dr. Houston states that the most notable event of the year under review was the opening of the Chingford reservoir and Humphrey pumps by His Majesty the King on March 15th.[1] This is not the only reservoir drawing water from the River Lee. There is already a chain of reservoirs at Walthamstow, having a combined capacity of 2,400 million gallons, and it is a little difficult to see how all these reservoirs are to be utilized for storage purposes, unless on the assumption that it is proposed to utilize flood water for this purpose. Dr. Houston goes on to say that it must not be forgotten that a progressive increase of storage capacity with no new or augmented source of supply inevitably tends in the direction of encouraging the abstraction of worse and worse river water. Reflections such as these have led Dr. Houston to experiment more and more on such supplementary processes of water purification as will convert the very worst river water into water of passable purity. In the interest of London water consumers it is necessary to look a long way ahead and not leave the solution of these and kindred difficulties entirely to posterity. The greater part of the report is of a technical character, and only a short summary can be given here.

Bacteriological Results.

The results of the bacteriological examination are stated as follows:

Raw Water.—The averages of microbes per cubic centimetre for the twelve months were as follows: Raw Thames water, 6,550; highest, 16,530 (October); lowest, 1,931 (May). Raw Lee water, 11,772; highest, 29,443 (October); lowest, 2,726 (May). Raw New River water, 2,777; highest, 6,770 (December); lowest, 1,055 (July).

Attention is again drawn to the fact that the amount of river water abstracted during the months when the river contains an excessive number of bacteria is so large as to emphasize the desirability of passing it through storage reservoirs antecedent to its filtration. It is possible, however, that by using on special occasions the supplementary processes of water purification alluded to in Dr. Houston's previous Research Reports, the yield of the Rivers Thames and Lee might, apart from economic considerations, safely be utilized to an extent hitherto not contemplated. In other words, at the price of supplementary processes of water purification, the "intakes" need practically never be "closed."

Filtered Waters (including Kent and Lee Valley Unfiltered Well Water).—The following statement indicates that the exclusive (that is to say, exclusive of samples containing 100 or more microbes per cubic centimetre) figures for the filtered waters were small and the percentage reduction effected by the processes of subsidence and filtration remarkably good:

	Thames.	Lee.	New River.
Raw water (microbes per c.cm.)...	6,550	11,772	2,777
Filtered water (microbes per c.cm.)	14.5	30.5	12.6
Percentage reduction	99.8	99.7	99.5

It is pointed out, however, that too much stress must not be laid on percentage reduction of microbes. The worse initially the raw water, the easier it is to obtain a final filtrate yielding satisfactory results on the basis of percentage purification.

The order of merit, based on the exclusive figures, is as follows, the average number of microbes per cubic centimetre being respectively:

Chelsea, 7.1; Kent, 9.1; New River, 12.6; Grand Junction, 14.7; West Middlesex, 14.8; Lambeth, 14.9; Kempton Park, 15.9; East London (Thames), 16.1; Southwark and Vauxhall, 18.2; East London (Lee), 30.5.

[1] British Medical Journal, March 22nd, 1913, p. 624.

Tests for Special Organisms.

The following are the results of tests for special organisms:

B. Enteritidis Sporogenes Test.

Raw Waters. — 49.0, 58.4, and 15.1 per cent. of the samples of Thames, Lee, and New River water respectively yielded positive results with 10 c.cm. of water.

Typical B. coli Test.

Raw Water.—The results, judged by this test, were unsatisfactory, having regard to the fact that the Rivers Thames and Lee are known to be seriously polluted with sewage, and that there is every reason to suppose that the majority of the *B. coli* found in the raw waters are of human excremental origin. The New River contained *B. coli* in 1 c.cm. (or less) in 48.1 per cent., the River Thames in 89.6 per cent., and the River Lee in 85.0 per cent. of the samples. Taking a one-figure average result, the average number of *B. coli* per cubic centimetre, according to this calculation, was as follows:

Typical B. coli per Cubic Centimetre of Raw Water.

	Arbitrary One-figure Result.
River Thames	15
River Lee	4
New River	0.5

The "best month" results were remarkably good, and the average results were also satisfactory.

For the filtered waters a one-figure result per cubic centimetre of water—expressed as typical *B. coli* per 1,000 c.cm. of water—is as follows:

Kent, Kempton Park, 1 to 2; New River, East London (Lee), Chelsea, Grand Junction, West Middlesex, Southwark and Vauxhall, Lambeth, 2 to 3; East London (Thames), 3 to 4; Lee derived water, New River derived water, Thames derived water, All London waters, 2 to 3.

It is noted that, whereas out of every 100 *B. coli* isolated from the raw Thames, Lee and New River waters, 85.4, 85.2, and 83.5 respectively proved to be typical *B. coli*, the corresponding figures for the filtered waters derived from these sources were 48.2, 38.7, and 44.8 respectively. The collective results were 84.8 in the case of the raw waters, and 45.6 in the case of the filtered —including a proportionately small number of unfiltered water samples. This is a *proportional* statement, and does not refer to the actual number of *B. coli* in the two cases.

CONCLUSIONS.

In conclusion, Dr. Houston says that about 80 per cent. of the London water supply is derived from sewage-polluted rivers. As judged by the usual chemical and bacteriological standards, the raw waters above the "intakes" for waterworks purposes are undoubtedly unsatisfactory in quality, particularly during the winter months. Within recent years a marked improvement has taken place in the methods of purifying sewage so as to render the resulting effluents non-putrescible and chemically unobjectionable. Apart from sterilization, however, no known practical process has yet been found which turns out a "safe" effluent, bacteriologically, and the great majority even of chemically satisfactory effluents are swarming with excremental bacteria. It is possible that improved methods of purification will, in a chemical sense, keep pace with increasing pollutions of the Rivers Thames and Lee, but the outlook bacteriologically is less hopeful. Prospective legislation as regards sewage purification would seem likely to run on the common-sense lines of protecting the general interests of the community at large, leaving to individual authorities, who venture to utilize polluted rivers for waterworks purposes, the full responsibility of employing such superadded processes of purification as the particular necessities of their own case demand. Belief in the future "safety" of London as regards water supply ought not, it is pointed out, to depend on the chimerical hope that the Thames and Lee are destined to become progressively less impure, but on increased knowledge as to the best means of purifying the water before it is sent into consumption.

Although the raw Thames and Lee contain *B. coli* in undesirable numbers, faecal streptococci are seldom discoverable in 1 c.cm. amounts of the water. Further, the results of a most elaborate search for the typhoid bacillus and Gaertner's bacillus have yielded practically negative results under conditions of experiment which have been shown to be successful in the case of artificially infected samples. Dr. Houston does not, however, contend that these pathogenic microbes are in reality uniformly absent, but that, if present, their numbers must be so small that it is almost inconceivable that any of them could ever survive passage through the storage reservoirs and reach the filter beds, which in their turn remove about 98 per cent. of bacteria of all sorts.

Storage.

Dr. Houston calls attention to the striking fact, shown in his past reports, that London is not really drinking merely filtered raw river water, but raw river water which by storage processes has been purified bacteriologically antecedent to filtration to a remarkable extent. If all the pre-filtration waters were mixed in their respective proportions, the quality of the mixed water antecedent to filtration would be such that on the average about one-third of the samples would contain no typical *B. coli* in 10 c.cm. of water. When it is remembered that 89.6, 54.7, and 10.7 per cent. of the samples of raw Thames water contain typical *B. coli* in 1 c.cm., 0.1 c.cm., and 0.01 c.cm. respectively, the corresponding figures for the Lee being 85.0, 39.8, and 8.7 per cent., the transformation the river water has undergone before filtration becomes strikingly apparent. Nor does even this represent the highest level of efficiency. Under different and elastic regulations as regards abstraction of river water, improved circulation of water in the storage reservoirs, and a more complete system of "pooling" of stored water interests, over one-half the samples (individually as well as collectively) of pre-filtration water ought to contain no typical *B. coli* in 10 c.cm. of water. Even putting sedimentation and devitalization completely on one side, the "levelling" effect of storage renders the possibility of any sudden, accidental, concentrated, and dangerous pollution of the river water above the "intakes" a matter of much less grave concern than would otherwise be the case. Storage, in this sense, is equivalent to dilution, inasmuch as it "spreads" the dose of poison over weeks or months; and it may, indeed, quite apart from any question of devitalization, render innocuous a microbial contamination which in a concentrated form would be apt to be highly dangerous.

Filtration.

Dr. Houston points out that the rate of filtration at the different works is unequal, and would seem to bear no apparent relation to the variable quality of pre-filtration water. Other things being equal, the rate of filtration at a works should be largely governed by the quality of the water that is being filtered. All the filter beds should have separate filter wells for sampling purposes. It is not sufficient that the quality of the mixed filtered water is good; it is most desirable that each of the filtration units should be in proven and perfect working order. The desirability of using only stored water becomes the more apparent when it is remembered that when a filter bed is yielding unsatisfactory results, the filtrate cannot, generally speaking, be run to waste until the reports are of a more reassuring character. Speaking generally, it would seem to be safer to use a coarse sand and filter rapidly when dealing with an adequately stored water than to use a fine sand and filter slowly when dealing with raw or inadequately stored river water. In the former connexion, as pointed out in a previous report, mechanical filters may play a useful part owing to the ease and rapidity with which they can be cleaned, but it is possible that the old sand filters if worked under slightly altered conditions—that is, using coarser sand and filtering more rapidly—may greatly increase their field of usefulness. The only way, apart from sterilization, of rendering the pre-filtration water always comparatively, if not absolutely, innocuous, is by sedimentation, devitalization, and equalization—in other words, by storage.

Service Reservoirs.

Service reservoirs should never be so small as to lead to variable rates of filtration during the twenty-four hours; hence a "pooling" of service reservoir accommodation is desirable. The equalizing and delaying effect of even

transitory storage in service reservoirs is the culminating step in the protection afforded to the water consumer.

The Water as Finally delivered to Consumers.

Over seven years' work on the London water question has convinced Dr. Houston that to a progressively increasing extent the Water Board is securing the reasonable, if not the absolute, "safety" of the metropolitan water supply. As a counsel of perfection he still feels bound to advocate the choice of an initially pure source of water supply; but his own results and experiments seem to indicate clearly that the evil effects even of an impure source can be largely, if not entirely, annulled by adequate storage and efficient filtration.

The Question of Accident.

Dr. Houston again points out that in addition to filtration and storage it is also necessary to guard against the possibility of accident. In this connexion questions of drainage, health of workmen, suction of impure water into water mains, laying of new mains, alteration to existing mains, condition of service reservoirs, etc., deserve attention. There is a growing tendency to regard any sudden accidental gross infection as of most dangerous significance, and to consider more constant but highly diluted pollutions as, relatively speaking, of lesser importance. The method of water purification now in progress (storage) renders the position "safe" as regards the river water, provided that no fresh and dangerous contamination takes place in connexion with the storage reservoirs, the filter works, the service reservoirs, or the delivery mains. Dr. Houston's final opinion is that the "*quality* policy" of the Metropolitan Water Board should be directed towards securing an "epidemiologically sterile" water (that is, a water containing none of the microbes associated with water-borne epidemic disease) antecedent to filtration by means of storage (sedimentation, devitalization, and equalization), aided, if need be, by the occasional employment of supplementary processes of water purification.

Complaints from Consumers.

Although in previous years very few complaints have reached the department as to the quality of the water, the year under review has proved to be a marked exception to this rule. Dr. Houston points out, however, that the complaints, which were very numerous, urgent, and justifiable, were confined almost entirely to the districts supplied with water derived from the Staines reservoirs. The Grand Junction District, despite the use of Staines water, escaped altogether, and the Kempton Park Works were only implicated on two occasions. The majority of the complaints arose from the consumers of West Middlesex water, and there can be no doubt, says Dr. Houston, that on a number of occasions, chiefly Mondays, the water had a most unpleasant, if transient, "geranium" taste and smell. The water, although always innocuous, was at times almost undrinkable.

Research Work.

Several special researches have been undertaken during 1905–13 and nine reports have been issued:

A special report (First Research Report) on the vitality of the typhoid bacillus in samples of raw Thames, Lee, and New River water. Another research (Second Research Report), which occupied twelve months, involved special search for the typhoid bacillus in samples (collected weekly) of raw Thames, Lee, and New River water. The results were negative. A special report (Third Research Report) on the question of storage was published in March, 1909. A report (Fourth Research Report) on the vitality of the cholera vibrio in raw river water was also published in the same year. A fifth report on research work was published in 1910, dealing with: (1) The results of the examination of samples of raw Thames and Lee water for the presence of the typhoid bacillus and Gaertner's bacillus; (2) the results of the examination of the raw river waters (Thames, Lee, and New River) for faecal streptococci; (3) the results of the examination of the pre-filtration water—that is, representative samples of practically all the London water (raw, stored, gravel, well, and mixed water) antecedent to filtration; (4) the negative results of the examination of samples of raw Thames, Lee, and New River water for the presence of Morgan's No. 1 bacillus; (5) the isolation of cholera vibrios from samples of raw river water artificially infected with only a few vibrios. A sixth report on the comparative vitality of "uncultivated" and "cultivated" typhoid bacilli in artificially infected samples of raw river water, with special reference to the question of storage, was also published in 1910. A seventh report was published in 1911. It dealt with (1) pathogenic microbes, (2) uncultivated bacilli, (3) temperature, (4) *B. coli*, (5) rapid sedimentation, and (6) coagulants. An eighth report on the softening, purification, and sterilization of water supplies (excess lime method) was published in February, 1912. A ninth report on search for certain pathogenic microbes in raw river water and in crude sewage has recently been issued.

The report is a most valuable document to all interested in the scientific and practical problems with which it deals, and Londoners in particular have reason to be grateful to Dr. Houston for his vigilance in watching over the purity of their water supply.

EXPERIMENTS ON LIVING ANIMALS.

The return showing the number of experiments on living animals during the year 1912 under licences granted under the Act 39 and 40 Vict., c. 77, has just been issued.

England and Scotland.

Professor Thane's report contains the names of all "registered places." Nine new places were registered for the performance of experiments, and one was removed from the register during the year. All licensees were restricted to the registered place or places specified on their licences, with the exception of those who were permitted to perform inoculation experiments in places other than a "registered place," with the object of studying outbreaks of disease occurring in remote districts or under circumstances which render it impracticable to perform the experiment in a "registered place." The names of all the persons who held licences during 1912 are given; the total number was 598. Reports furnished by the licensees show that 151 of them performed no experiments. The numbers given above include 16 licensees whose licences expired on February 29th, 1912, and of whom 14 returned no experiments in 1912. The experiments are, as usual, set forth in a table (IV), which is divided into two parts, A and B, for the purpose of separating experiments performed without anaesthetics from experiments in which anaesthetics were used.

Number of Experiments.

The total number of experiments included in Table IV (A) is 5,043. Of these there were performed:

Under licence alone	2,584
Under Certificate C	219
Under Certificate B	1,673
Under Certificate B + EE	567

Table IV (B) is devoted entirely to inoculations, hypodermic injections, and some few other proceedings, performed without anaesthetics. It includes 78,556 experiments, whereof there were performed:

Under Certificate A	78,225
Under Certificate A + E	321
Under Certificate A + F	10

The total number of experiments was 83,599, being 11,604 less than in 1911. There was a decrease in the number of experiments included in Table IV (A) of 47, and a decrease of 11,557 in Table IV (B).

The Use of Anaesthetics.

The larger part of the experiments included in Table IV (A)—namely, all performed under licence alone and under Certificate C, 2,803 in number—come under the provision of the Act that the animal must be kept under an anaesthetic during the whole of the experiment, and must, if the pain is likely to continue after the effect of the anaesthetic has ceased, or if any serious injury has been inflicted on the animal, be killed before it recovers from the influence of the anaesthetic.

In the experiments performed under Certificate B, or B linked with EE, 2,240 in number, the initial operations are performed under anaesthetics, from the influence of which the animals are allowed to recover. The operations are required to be performed antiseptically, so that the healing of the wounds shall, as far as possible, take place without pain. If suppuration occurs the animal must be killed. After the healing of the wounds the animals are not necessarily, or even generally, in pain.

In the event of a subsequent operation being necessary in an experiment performed under Certificate B, or B linked with EE, a condition is attached to the licence requiring all operative procedures to be carried out under anaesthetics of sufficient power to prevent the animal feeling pain; and no observations or stimulations of a character to cause pain are allowed to be made without the animals being anaesthetized.

In no case has a cutting operation more severe than a superficial venesection been allowed to be performed without anaesthetics.

The experiments included in Table IV (B), 78,556 in number, were all performed without anaesthetics. They were mostly inoculations, but a few were feeding experiments, or the administration of various substances by the mouth or by inhalation, or the abstraction of blood by puncture or simple venesection. In no instance has a certificate dispensing with the use of anaesthetics been allowed for an experiment involving a serious operation. Inoculations into deep parts, involving a preliminary incision in order to expose the part into which the inoculation is to be made, must be performed under anaesthetics.

Professor Thane goes on to say:

It will be seen that the operative procedures in experiments performed under Certificate A, without anaesthetics, are only such as are attended by no considerable, if appreciable, pain. The certificate is, in fact, not required to cover these proceedings, but to allow of the subsequent course of the experiment. The experiment lasts during the whole time from the administration of the drug, or injection, until the animal recovers from the effects, if any, or dies, or is killed, a period possibly extending over several days, or even weeks. The substance administered may give rise to poisoning, or set up a condition of disease, either of which may lead to a fatal termination. To administer to an animal such a poison as diphtheria toxin, for example, or to induce such a disease as tuberculosis, although it may not be accompanied by acute suffering, is held to be a proceeding "calculated to give pain," and therefore experiments of the kind referred to come within the scope of the Act 39 and 40 Vict. c. 77. The Act provides that, unless a special certificate be obtained, the animal must be kept under an anaesthetic during the whole of the experiment; and it is to allow the animal to be kept without an anaesthetic during the time required for the development of the results of the administration that Certificate A is given and allowed in these cases.

It must not be assumed that the animal is in pain during the whole of this time. In cases of prolonged action of an injected substance, even when ending fatally, the animal is generally apparently well, and takes its food as usual, until a short time before death. The state of illness may last only a very few hours, and in some cases it is not observed at all.

In a very large number of the experiments included in Table IV (B) the results are negative, and the animals suffer no inconvenience whatever from the inoculation. These experiments are therefore entirely painless.

In the event of pain ensuing as the result of an inoculation, a condition attached to the licence requires that the animal shall be killed under anaesthetics as soon as the main result of the experiment has been attained.

Cancer Investigation Experiments.

During the year 1912, 24,870 experiments were performed by 24 licensees, working at eight institutions, in the course of cancer investigations. Of these, 521 are in Table IV (A) and 24,349 in Table IV (B). The latter were almost entirely inoculations into mice.

Experiments for Government and Public Bodies.

A large number of experiments, almost all simple inoculations and similar proceedings contained in Table IV (B), were performed either on behalf of official bodies, with a view to the preservation of the public health, or directly for the diagnosis and treatment of disease. Several county councils and municipal corporations have their own laboratories in which bacteriological investigations are carried on, including the necessary tests on living animals, and many others have arrangements by which similar observations are made on their behalf in the laboratories of universities, colleges, and other institutions. A sewage farm is registered as a place in which experiments on living animals may be performed in order that the character of the effluent may be tested by its effects on the health of fish. The Local Government Board and the Board of Agriculture and Fisheries have laboratories which are registered for the performance of experiments having for their object the detection, prevention, and study of diseases of man and animals. In other places experiments have been performed on behalf of the Home Office, the Naval Medical Service, the War Office, the Army Medical Department, the Army Medical Advisory Board, the Army Veterinary Service, the Local Government Board, the Metropolitan Asylums Board, and the Advisory Committee for Plague in India.

Eighty-two licensees report over 22,000 experiments which were performed for Government Departments, county councils, municipal corporations, or other public health authorities; and fifteen licensees performed over 12,000 experiments for the preparation and testing of antitoxic serums and vaccines, and for the testing and standardizing of drugs.

Inspections.

During the year the usual inspections of registered places were made by Professor Thane and Sir James Russell. They saw numerous animals under experiment, both of those coming into Table IV (A) and of those coming into Table IV (B). They everywhere found the animals suitably lodged and well cared for, and the licensees attentive to the requirements of the Act, as well as to the conditions appended to their licences by the Secretary of State.

Irregularities.

The following irregularities occurred during the year:

A licensee holding certificates for certain experiments on various animals performed an operation of the same nature on two rabbits, which were not named in his certificate B.

A licensee holding certificates B, EE, for certain experiments on cats performed an operation of a similar character in a situation other than that specified in the certificate.

A licensee holding Certificate B for experiments on guinea-pigs and frogs performed 10 experiments in excess of the number for which the certificate was given.

A licensee holding Certificate A for inoculations administered substances to animals by feeding, that proceeding not being specified in the certificate.

The Secretary of State was satisfied from the explanations which were given that these errors were due to misunderstanding or inadvertence, and that in none of the cases was any operation performed which he would have refused to allow if it had been covered by the terms of the certificate submitted; and by his direction a suitable admonition was addressed to the licensee in each case.

IRELAND.

Dr. J. F. O'Carroll reports that in 1912 there were in Ireland 15 registered places; in two of them no person was licensed to perform experiments during the year 1912. One place was newly registered and one has ceased to exist. Twenty-one licences were in force during the year, and no new licences were issued. One licence lapsed on December 31st, 1911.

Number of Experiments.

The experiments performed were 287 in number, 21 under licence alone and 266 under certificates. Seventeen licensees performed experiments, the number of experiments under each certificate being:

Under Certificate A	213
Under Certificate C	49
Under Certificate E + A	4

Animals Used.

The animals experimented on were as follows: Guinea-pigs, 123; rabbits, 67; cats, 31; mice, 17; dogs, 11; cattle, 15; sheep, 2; pigs, 2; frogs, 19.

Nature of Experiments.

Of the experiments 74 were physiological, 15 therapeutical, and 198 pathological. The greater number consisted of hypodermic injections and inoculations. Apart from the very limited number of experiments made for the purpose of teaching students some of the fundamental principles and methods of physiology, the majority of the investigations of the year dealt, by means of simple hypodermic injection, with questions of diagnosis of infective disease in man and the lower animals, and with the effects of antidotal vaccines. Some of the original investigations on respiration, ethyl chloride, and nutrition, noted in last year's report, were continued during 1912.

Dr. O'Carroll is satisfied that all the holders of licences have carried out their experiments in accordance with the provisions of the Act.

THE INTERNATIONAL DENTAL FEDERATION.

THE annual meeting of the International Dental Federation, held at the Hague on August 27th to 29th, was well attended by the delegates of the twenty-three countries represented in the Federation. Mr. W. B. PATERSON, F.R.C.S., L.D.S. (London), in his presidential address, gave an outline of the arrangements for the sixth International Dental Congress, which will be held at the University of London and the Imperial College of Science and Technology from August 3rd to 8th, 1914, and of which the King has consented to be patron. He stated that the Foreign Office had invited official delegates from all the principal countries of the world to attend the congress, and the Colonial Office had done the same for the self-governing dominions of the British Empire.

Dr. C. VAN DER HOEVEN (the Hague) welcomed the Federation on behalf of the Dental Societies of Holland.

Mr. J. HOWARD MUMMERY, M.R.C.S., L.D.S. (London), President-elect of next year's congress, spoke for Great Britain, and extended a cordial invitation to the delegates present, the following of whom replied: Dr. BROPHY (Chicago), Dr. SCHAEFFER-STUCKERT (Frankfort-on-Maine), M. VILLAIN (Paris), Dr. WEISER (Vienna), Dr. GUERINI (Naples), M. ROSENTHAL (Brussels), Dr. AGUILAR (Madrid), Professor CHRISTENSEN (Copenhagen), Mr. LENHARDTSON (Stockholm).

Telegrams were sent to the Queen-Mother of Holland, the King of Denmark, and the King of Sweden, in recognition of their patronage of the Dental Hygiene National Committees in their countries, and gracious replies were received. The Federation afterwards resolved itself into its various commissions.

Hygiene Commission.

Professor JESSEN (Strassburg) presided over the Hygiene Commission, and announced that many new national committees and associations had been established, notable progress having been made in Russia, where dental treatment was prominent in the Hygiene Exhibition now being held in St. Petersburg. In the report of the secretary of the Commission, it appeared that in Great Britain many education authorities were appointing whole-time or part-time school dentists. London had now twelve dental clinics, and twenty would be in operation by the end of this year. The county of Montgomery (Wales) had appointed two school dentists, one of whom would have a dental surgery caravan for travelling through country districts. Germany had now 200 dental clinics for school children in full working order, and efforts were being made to provide for rural districts. In the United States of America the Forsyth Children's Dental Institute, costing over three million dollars, would be opend in Boston in November next; and Professor Jessen, at the request of the President, would attend the ceremonial as the representative of the Federation. It was also announced that a Royal Commission had been appointed in Sweden, following upon the meeting of the Federation in Stockholm last year, to organize school dental treatment.

Commission on Education.

Dr. BROPHY (Chicago), in the absence of Dr. Kirk (Philadelphia), presided over the Commission on Education. Dr. W. GUY (Edinburgh) presented the report. At the request of Dr. DUBEAU (Montreal), delegates were appointed to attend the opening of the new dental school in October. The school buildings have been erected by the Government of Quebec Province at a cost of £60,000. Delegates were also appointed to attend the inauguration of the new dental school at Philadelphia, U.S.A., in 1914, founded under the will of the late Dr. T. W. Evans of Paris. A coloured print of the architectural details of the Philadelphia school, which was distributed at the meeting, disclosed a clever blending of the external characteristics of Magdalen College, Oxford, with the most modern and up-to-date requirements in the matter of internal lighting. It is anticipated that some £200,000 will be expended in the cost of production. The Commission considered the question of dental pedagogics, and ordered a report to be presented at the London Congress.

Commission of Bibliography and Statistics.

The Commission of Bibliography and Statistics was presided over by M. HUET (Brussels), who reported on the progress being made in the codification of documents and statistics relating to dental curricula, registration of dentists, and dental literature thoughout the world, a report of which was ordered to be presented to the London Congress, and a salaried assistant was appointed to take charge of the same.

Dentistry and Medical Inspection of Schools.

At the concluding meeting the Federation passed a resolution urging upon all Governments the importance of including treatment by qualified dentists in all State-aided schemes of medical assistance, and especially in the case of children.

Banquet.

The banquet of the Federation was held at the Palace Hotel, Scheveningen, during the course of which the PRESIDENT presented to Dr. Charles Gordon, officer of the Legion d'Honneur and chief of the Ecole Dentaire, Paris, the Diploma of Honour of the Miller Prize, a prize founded in memory of the late Professor Miller, of Berlin, and awarded biennially by the Federation to the person who "has rendered the most eminent services to dentistry."

Lecture by Professor Bolk.

On Saturday, August 30th, Professor BOLK delivered a lecture before the Federation in the Anatomical Theatre of the University at Amsterdam, on the results of his examination of the teeth and jaws of 30,000 crania. Amongst various differences noted he dwelt in particular upon (*a*) the non-eruption of the mandibular second premolar and the continued existence of the mandibular second milk molar until middle age; (*b*) the so-called maxillary fourth molar, which he demonstrated in some thirty specimens to be a single-rooted tooth with a molariform crown, existing buccally between the second and third maxillary molars ("para-molar" he named it), or behind the third molar (disto-molar); (*c*) the proximity of the roots of the teeth to the maxillary antrum, more especially in the region of the second and third molars.

The members of the Federation afterwards visited the Museum and inspected the specimens, the mounting of which was generally admired. Professor Bolk spoke in French, as the language of international diplomacy, in his welcome to the Federation, and in English, as the language of international dentistry, during his address.

Entertainments.

The dental societies of Holland provided various entertainments for the Federation, including an excursion to the Muiderslot Castle and the Zuyder Zee, and notwithstanding the crowded state of the Hague during the ceremony attendant upon the opening of the Palace of Peace, the comforts and pleasures of the members of the Federation were well looked after, and elicited warm approval on all hands.

MOTOR CARS FOR MEDICAL MEN.

THE DE DION BOUTON 12-H.P. MODEL.

AT one time it was comparatively easy to classify a motor car merely by a brief examination of its general structure, coupled, perhaps, with a few hours' trial of its work on the road. But this is no longer the case; the whole art of engine designing and body building has made great advances, and all cars which make any serious bid for public favour are so well thought out that in weighing their comparative merits, fine points (including the special point of view of their prospective purchaser) have to be taken into consideration. In addition, any practical test to which the car is submitted must be very prolonged. Still, there is a good deal that can be found out even by a short road trial; the probable accuracy of the statements of those who have had such a car for some time, and exhibit enthusiasm as to its merits, can, for instance, be assessed. This being the case, it seemed worth while recently to take advantage of an opportunity of trying the 12-h.p. four-cylindered car which Messrs. De Dion put on the market some years ago, and which, with a few modifications, they have made their model chassis for cars of this power for the current year. We gave it a six-hour trial, running it, in this time, 104 miles, dividing the time between roads on which there was heavy traffic, very hilly ground, and straight level roads. In traffic the engine proved very easily controlled,

allowing the rate of progress to be reduced to a walking pace when required and quick movement to be obtained from a practical standstill. On one occasion extreme use of the throttle, during an intentional pause, stopped the engine unexpectedly, owing to the over-fine, but easily altered, adjustment of the throttle stop. Out in the country its work was equally satisfactory, all hills being taken with entire ease and no tendency to overheating showing itself. With regard to speed, the rate on the second gear, with 1,600 revolutions per minute, is, according to the makers, 16¾ miles an hour, but the actual rate of travel as gauged by the speedometer seemed to soar considerably higher than this, the same being also true of the third forward gear, which normally gives 28$\frac{7}{16}$ miles per hour. The car, therefore, was certainly capable of travelling at all reasonable speeds from slow to fast. The reverse gear also worked satisfactorily, and in the way of noise there was nothing beyond a pleasant hum while hill-climbing. For a car not sufficiently heavy to demand shock-absorbers, progress was smooth. The trial, therefore, so far as it went, endorsed the very emphatic approval of several medical men who have had cars of the same build for several years. For taxation purposes it is a three-guinea car, subject to the usual reduction in the case of medical owners. The average petrol consumption appeared to be about a gallon for each thirty miles. In regard to throttle and brake, Messrs. De Dion have adhered to the plan which they adopted with their earliest cars—namely, that of controlling both throttle and brake by one pedal, the first part of the downward movement of the pedal closing the throttle and the remainder bringing into action a double shoe brake which is applied to the end of the second gear shaft. This, besides being a very logical arrangement, has the advantage of simplifying driving. The complete car price ranges between £350 10s. and £389 10s., according to the type of body fitted.

"JUGGINS" will be glad if any one who has had experience with the Dodson valveless—two-stroke—engine will give him any information as to its virtues or vices. The conception, he says, seems so absolutely ideal that one is compelled to believe there must be compensatory disadvantages which prevent its taking the foremost place to which it is otherwise apparently entitled. Any opinions, favourable or the reverse, will be appreciated, as "Juggins" desires to be helped to make up his mind.

"VERDANT GREEN" asks if any medical motorists can advise a Coupé car costing from £250 to £350; also the probable cost for upkeep, etc. Most Coupé cars on the market cost over £400, and would require an expensive driver.

DR. R. ALEX. SHANNON (Crofton, Orpington, Kent) writes: On page 556 of BRITISH MEDICAL JOURNAL of August 30th I observe a request from "M. S." about brass-cleaning fluid, and I beg to enclose the following, which I have found to be an excellent brass-polishing fluid:

Oxalic acid	℥iv
Powdered rotten-stone	℥vi
Paraffin	℥iv
Methylated spirit	℥vi

Dissolve the acid in half a pint of boiling water, and, when dissolved, add the rotten-stone; shake well; add the paraffin and spirit, and make up to half a gallon with boiling water.

DR. L. F. HEMMANS (Lewisham, S.E.) writes: In reply to "M. S.," I use the following compound as a brass polish:

Cret. praep., liq. ammon. fort.	āā ℥j
Sp. vini rect.	℥vi

A BOARD for the study of tropical diseases has been organized by the Medical Department of the United States Army at Ponce, Porto Rico. Major Bailey K. Ashford has been appointed President of the Board.

THE Society of Medical Heads of Laboratories of Radiology and Electro-Radiotherapy of the Paris Hospitals has organized courses of lectures, theoretical and practical, of electrology, roentgenography, and radiology. Two courses will be given every year, one in November the other in May, each lasting a month. The first will be given from November 3rd to December 2nd, 1913, in the theatre of the Hôpital de la Pitié, 83, Boulevard de l'Hôpital, Paris. The opening lecture will be delivered at 4.30 p.m. on November 3rd by Dr. A. Beclère, physician to the St. Antoine Hospital, and member of the Académie de Médecine. Practical demonstrations will be given in the morning in the laboratories of radiology and electro-radiotherapy of the Paris hospitals. The courses are free. Application should be made to Dr. Delherm, Boulevard de l'Hôpital, 83, Paris (XIII^e), or to Dr. Aubourg, Rue de la Convention, 62, Paris (XV^e).

ONE HUNDRED YEARS AGO.

RICHARD BRIGHT ON SEPTEMBER 13TH, 1813.

ON September 13th, a hundred years ago, Richard Bright was one of a band of twenty-three young graduands who received the degree of Doctor in Medicine from the University of Edinburgh, "after having gone through the appointed examinations, and publicly defended their respective inaugural dissertations." They constituted the autumn band of graduates, for on June 24th another and a larger band (thirty-nine in number) had emerged from the academic portals. The total output, so to say, of young doctors from Edinburgh for the year was 62, of whom 28 belonged to Scotland, 15 hailed from England, 9 from Ireland, 4 from Jamaica, 2 from Wales, and 1 each from Canada, America, St. Croix, and the Canary Islands.[1]

At the autumn graduation there were four candidates besides Bright who wrote "Anglus" after their names: these were John Conquest, Stevenson Eden, Robert G. A. Collingwood, and Joseph Dyneley. The future discoverer of the great clinical fact that dropsy with albuminuria is due to a disease of the kidney was already the greatest man of the quintet, and showed promise of what he afterwards became—the most distinguished graduate of his year. It may be supposed that it was in this little group of Englishmen that young Bright formed his college friendships; but through his membership of the Royal Medical Society he would be brought into touch with men from all parts of the world, and since he was president for the year he was certainly known to all the other members of that society. Still he would draw naturally enough to his fellow-countrymen; and it is interesting to find that the name immediately preceding his in the list of graduates is that of John Conquest. Indeed, these two names, Bright and Conquest, are the only ones which are immortalized in the pages of that British temple of honour, the *Dictionary of National Biography*. Another great medical man, for whom that temple finds a niche, was now a student in the university and may have been known to Richard Bright, but he was not to receive his M.D. till 1815; this was Thomas Addison, afterwards Bright's colleague in Guy's Hospital.

At any rate, however these other things were, we can safely have in our mind's eye John Conquest, sitting beside Ricardus Bright on that September morning a hundred years ago, little dreaming that together they were to enter the pages of the *Dictionary of National Biography* in that future which to them, as to all other young and healthy graduands, had, we doubt not, an abundance of roseate hues of hope on that occasion at least. John Tricker Conquest, to give him his full name, was of the same age as Bright, having been born in 1789. In a way of his own, not indeed so luminous and brilliant as that of his class-mate, Conquest added to the literature of medicine: in 1820 he published his *Outlines of Midwifery;* ten years later he gave an address on puerperal inflammation to the Hunterian Society; and eighteen years after that event he brought out his widely read work entitled, *Letters to a Mother on the Management of Herself and Her Children in Health and Disease*. He was apparently the typical "man-midwife" of the period, and one cannot successfully combat Dr. Norman Moore's description of the *Letters*, as "written in a sickly style with no scientific or practical merit."[2] Conquest, who settled in London, lectured on midwifery there; at first he gave four courses of lectures in each year in his own house at Aldermanbury Postern, charging three guineas to each student attending; but later (in 1825) he was appointed lecturer on midwifery in the medical school of St. Bartholomew's Hospital and taught there. It was a very different career from that of Richard Bright, but it was spent as Bright's also was, in London, and doubtless the old class-mates met upon occasion in the metropolis and exchanged courtesies, sharing a reminiscence or two possibly of the September morning in Edinburgh when both were "capped." That there would be more than this is doubtful, Bright being a Guy's man, and Conquest firmly attached to Bart's.

Richard Bright was a native of Bristol,[3] where his father (also a Richard) was merchant and banker. At the age of

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[1] *Edinburgh Medical and Surgical Journal*, vol. ix, p. 498 1813.
[2] *Dictionary of National Biography*, vol. xii, p. 31.
[3] *Dictionary of National Biography*, vol. vi, p. 334.

19 he began to study in the Faculty of Arts in the University of Edinburgh, and came under the influence of Dugald Stewart (moral philosophy), John Playfair (natural philosophy), and John Leslie (mathematics); and this influence was no slight one, as Bright's after-life was to show. Dugald Stewart was a great force in these days, and Sir Leslie Stephen[4] says that during his life Edinburgh continued to be scarcely inferior to London as a centre of intellectual activity. His class numbered 150 students in the year (1808–9) when Bright attended, and had reached 196 in the previous year. In 1809 young Bright passed into the Medical Faculty to receive instruction from Hope (chemistry), Andrew Duncan (physiology), and Alexander Monro *tertius* (anatomy), and these, too, were names to conjure with.

In 1810 Bright had a temptation put before him which he was unable then, and also later, to resist—we mean the attraction of foreign travel. In the summer of that year he was invited to pay a visit of some months to Iceland in company with Sir George Steuart Mackenzie of Coul, the noted mineralogist, who, some ten years before, had obtained decisive proof of the identity of diamond with carbon, and Richard Bright made one of the three scientists who sailed for that little known part of the world. The third member of the party was Mr. (afterwards Sir) Henry Holland. He was, we may say, the senior medical student of the little expedition as Bright was the junior, and he had no small influence in determining the life and career of the latter. Holland had spent a year (1803) at Bristol, probably getting to know Bright then and there; later he studied first at Glasgow and second at Edinburgh, and he also put in two winters at Guy's and St. Thomas's Hospitals in London; he took his M.D. at Edinburgh in 1811, and then spent a year and a half in Continental travel in south-eastern Europe. Now Richard Bright also went to study at Guy's and St. Thomas's Hospitals before he took his degree at Edinburgh in 1813, and he, too, after graduation spent more than a year travelling on the Continent, especially in Austria and Hungary. There can be little doubt Bright had Holland in his mind when he carried out his programme of studies for the four years following the trip to Iceland. In the long summer days of 1810 spent by the young men cruising in the north there would be full opportunity to talk over and to plan out the future.

On their return to Britain Sir George Mackenzie, Holland, and Bright collaborated to bring out *Travels in Iceland*, published in Edinburgh in 1811; Holland contributed "Diseases of the Icelanders," and Bright wrote on the botany and zoology of the island. Whilst the volume was passing through the press Bright was studying medicine in London, working at anatomy and surgery under Astley Cooper in the united school of Guy's and St. Thomas's; he received, it has been thought, from Cooper that impression of the value of morbid anatomy in the study of disease which was afterwards to prove so potent in leading him to his great accomplishments in medicine, and especially to that one with which his name is indissolubly united.

Again, however, medicine was powerless to hold him fast, and he had another breakaway from the beaten tracks—on this occasion to the study of geology as revealed by the strata near his own town of Bristol. One need not wonder at his interest in geology: it was one of the nascent subjects of scientific inquiry at the time, and Bright's natural curiosity and industry supplied the only other incentives required. He had been studying in Edinburgh, where James Hutton, also a medical man, let it be remembered (M.D.Leyden of 1749), had carried on his epoch-making work on geology, and had published his magnificent "Theory of the Earth." It is easy to criticize Hutton now, and to see that he over-emphasized plutonic in opposition to neptunian agencies; but he was a "prodigious pioneer," and "sole founder of modern dynamical geology"; as a modern writer[5] has said, "from being a static science geology became in his hands a science of change and of process," with "no signs of a beginning," as Hutton himself said, and "no prospect of an end." The great geologist, it is true, had died in 1797; but Bright was a pupil of his exponent, John Playfair, the man who suggested the transportation of isolated boulders by means of moving ice as an explanation of the strange positions on which they are found. Men's minds were in a ferment with the new ideas to which geology was giving birth, and to Bright's intelligence the whole subject must have been intensely fascinating. He was influenced, too, no doubt, by Dr. W. Babington, his teacher in medicine at Guy's Hospital, and a lover of geological studies. At any rate, Bright read a paper on the strata near Bristol to the Geological Society in 1811.

But Bright always returned to medicine, and he was found again at Edinburgh studying under Dr. Gregory, a great man, but very irascible, and too ready, on one occasion at least, with his stick (as the midwifery professor of these combative days was quick to allege). Bright's return was in 1812, and even in these months so soon before his graduation he was studying geology and natural history under Professor Robert Jameson. He graduated, as has been said, in September, 1813, and we emphasize the year, for the *Dictionary of National Biography*, by a printer's error (uncorrected unfortunately in the volume of *Errata*), makes it 1812.

Bright was the author of two dissertations in 1813: one was his inaugural or M.D. thesis, and the other was the paper which he contributed to the *Proceedings* of the Edinburgh Royal Medical Society, and by means of which he became an Extraordinary Member of that body, with all the advantages pertaining thereto (for example, freedom from fines and compulsory attendance). The Royal Medical Society's dissertation was on the subject of "gangrene," and proves very unattractive and uninteresting reading nowadays.[6] Bright, however, marshals his facts in an orderly way, first defining the "extensive signification" in which he would apply the term "gangrene," then discussing its causation under the heads of predisposing, proximate, and exciting causes, and then proceeding to treatment, prognosis, and diagnosis, with a few illustrative cases and with references to the works of Quesnay, Kentish, O'Halloran, La Motte, Dease, Huxham, La Dran, Cullen, Willan, Pott, and Home. In a wilderness of dry and arid speculations on matters which have ceased to have interest, there are one or two green spots where it is evident that Bright's mind was supplying some fertilizing and vitalizing influence. Thus, speaking of the gangrene of hospitals, Bright said:

> The beneficial powers of fresh air are not perhaps even yet [1813] sufficiently appreciated; physicians are becoming every day more and more enlightened upon this point; in certain instances they may even carry their practice beyond the bounds of prudence; but the surgeon should likewise be instructed how little his art can do while he permits Nature to be thwarted in her kindest attempts, and deprived of that assistance [ventilation and cleanliness] to which so much is intrusted whilst the body is unconfined by disease.

After so near an approach to the ideas underlying the asepsis of the present day, Bright went on to state that sores might change from a healthy to an unhealthy state by reason of too tight bandaging, or—and the modern surgeon will say "I consent" to this also—from the use of sponges and fomentation cloths which are not properly washed. Then Bright added a sentence emphasizing the constitutional factor in no half-hearted fashion:

> There are, however, independently of these causes, some circumstances which we cannot prevent; a man whose body has been constantly under the influence of strong drink, or whose advanced period of life has reduced his constitutional energy, may fairly be suspected to repair the injury he has sustained with less facility than one whose powers are unbroken.

Again, dealing with treatment, young Bright has this penetrating sentence:

> As our science has advanced, medical men have learned to apply their remedies, not to the name but to the disease; hence it might occur that bleeding should be necessary in one instance, while bark and stimulants are indispensable in another; and it is the power of distinguishing these that stamps the merit of the practitioner.

This is good and sound advice, not yet obsolescent even in these days when the "torch of science is being brandished and borne about" with so much effect of one kind and another. But, whilst this piece of advice is not by any means obsolete, much that is written in this hundred-years'-old dissertation is of a class of things which have passed clean away from us. How much the

[4] *Dictionary of National Biography*, vol. liv, p. 283.
[5] *Harmsworth's Popular Science*, VII, p. 4608.
[6] *Dissertations by Eminent Members of the Royal Medical Society*, p. 64, Edinburgh, 1892.

phenomena of gangrene were due to micro-organisms grafting themselves on the affected part was, of course, quite unsuspected, and the whole treatment of the disease by amputation was hindered and hampered by the limitations existing in a surgery which was without anaesthesia and asepsis. Gangrene, it is true, still occurs with us, and especially that senile form of it which Bright describes so well as being met with in men advanced in age, especially "the rich and voluptuous, who eat to excess"; but hospital gangrene and other terrors, under whose shadow as of death our surgical forefathers did their work and fainted not, have become so rare that many of us cannot recollect a single instance in thirty or forty years of practice.

In this dissertation, read before and discussed by the members of the Royal Medical Society in 1813, there is a reference to the connexion existing between erysipelas and gangrene which is of some interest, for Richard Bright's M.D. dissertation of the same year was on the subject of *Contagious Erysipelas*. We give here the words of the title-page of the dissertation, but we are not to follow the author through the tangled thickets which surrounded him as he tried to trace the difference between contagion and infection and to understand the spreading of erysipelas without a knowledge of its microbic cause.

DISPUTATIO MEDICA
Inauguralis
de
ERYSIPELATE CONTAGIOSO;
quam,
annuente summo numine,
ex auctoritate reverendi admodum viri,
D. GEORGII BAIRD, SS.T.P.
Academiae Edinburgenae Praefecti:
necnon
Amplissimi Senatus Academici Consensu,
Et Nobilissimae Facultatis Medicae Decreto;
Pro Gradu Doctoris,
Summisque in Medicinae Honoribus ac Privilegiis
Rite et Legitime Consequendis;
Eruditorum Examini Subjicit

RICARDUS BRIGHT,
Anglus,
Societ. Reg. Med. Edin. Soc. Extraord.
et ejusdem
Praeses Annuus.

Foenum habet in cornu; longe fuge;
Hor. Sat. Lib. I. Sat. 4.

Die XIII Septembris horâ locoque solitis

EDINBURGI:
Excudebat Robertus Allan.
MDCCCXIII.

Enough that Dr. Bright successfully defended his thesis and got his degree, and so prepared himself for the great work which was waiting for him in London. But, before quite leaving the dissertation "De erysipelate contagioso," we may pause for a moment to look at the Latin motto from Horace's fourth satire, which stands at the foot of the title-page. A glance over the other dissertations of the year 1813 reveals the fact that all the candidates did not succeed in finding appropriate classical quotations wherewith to adorn their theses; neither, for that matter, did all of them write such good Latin. Some, however, were happy in their choice of tags of verse from Virgil, and Horace, and Seneca, and other writers of antiquity. What, for instance, could be more appropriate than John Symons's quotation for his dissertation on dyspepsia, which was "Multos morbos multa fercula fecerunt" (many meals make much—dyspepsia). William Gairdner could find nothing suitable for his thesis on dysentery, nor could Mr. Urquhart, from Orkney, writing on the same subject; but Archibald Shanks, not without a certain sly humour in him, put down "Morbi non eloquentia sed remediis curantur." Farrell could find no appropriate Latin versicle for croup, but Mignot (on the same subject), with a grave prognosis in mind, quoted Virgil's lines, "Infantumque animae flentes—quos dulcis vitae exsortes—abstulit atra dies, et funere mersit acerbo."[1] Bright, as we have said, quoted from Horace, and showed that he also had humour. "Foenum habet in cornu; longe fuge," he wrote as his motto for a dissertation on a contagious malady; and it is not difficult to get a glimmer of his meaning. "He has hay on his horn, keep aloof," it may be translated, or "take care of the mad bull." "Erysipelas is catching," Bright means us to believe, "so don't put your patient in the next bed to it, but at the far end of the ward."

We have tried to catch a glimpse of Dr. Richard Bright as he was in 1813; but of his residence in Peterhouse at Cambridge, of his Continental travels in 1814–15 and of the book he wrote about them (large, interesting, with plates from his own drawings), of his visit to Brussels a fortnight after the battle of Waterloo, of his work in the London Fever Hospital, and of the nearly fatal attack of fever he there contracted, of his further travels on the Continent, of his appointment to Guy's Hospital, and the amazing amount of work he did there, both in the wards and in the *post-mortem* room, and so on to the end of a well-filled life in 1858, we cannot now speak. Enough, however, has been revealed of his character, as it was already outlined in 1813, to show that he was many-sided and a man of great versatility—passing rapidly from Edinburgh to London and from the latter place to Bristol, going off to Iceland when he should have been sitting in the class rooms, writing on geology when he should have been thinking of medicine, and yet with it all a good linguist, a bit of an artist, a writer of travels, and already a keen, unbiassed, and sagacious observer of medical phenomena and a man of extraordinary industry. It was no raw youth who presented himself on September 13th, 1813, to receive the degree of M.D., but a man who had already made his mark firmly, and who even then exhibited in himself all these qualities which were to lead him unerringly to the solution of many problems in medicine, and particularly to that one whose elucidation, appropriately enough, is summed up in the words "Bright's disease."

IN MEMORIAM J. S. BILLINGS.

WE have received a report of a memorial meeting in honour of the late Dr. John Shaw Billings, held at the New York Public Library, of which he was Director from 1896 till his death on March 11th, 1913. Among those who spoke were Dr. Weir Mitchell, Sir William Osler, Dr. William H. Welch, and Mr. Andrew Carnegie.

Dr. WEIR MITCHELL gave some interesting information as to the early struggles of Billings. At 15, out of his small savings he bought a Latin dictionary and grammar, and taught himself the language in order that he might understand the Latin quotations he came upon in his reading, which already was extensive. By acting as a tutor in the summer holidays he passed through Miami University, taking the A.B. degree in 1857. In his last year at college he added to his resources in a somewhat unusual way. A man who was exhibiting pictures on a screen was so evidently embarrassed by his inability to explain them that Billings offered to assist him, and during the summer he went with the showman from place to place lecturing on whatever scenes were exhibited. In this way he gained enough money to carry him through his academic work and to enter the Medical College of Ohio, where he took his degree in 1860. During the period of medical study he paid his way by taking care of the dissecting-rooms and by living in the college. Speaking to Dr. Weir Mitchell of those years of privation, Billings expressed his belief that he never recovered from the effect of one winter in which he lived on 75 cents a week, his food being chiefly milk and eggs. After taking his degree he got a post as demonstrator of anatomy, and held appointments in two hospitals. The Roman Catholic sisters who conducted the nursing used to speak of him as St. John of the Hospital on account of the "gentle gravity, the look of mild melancholy—never quite lost in after days—the lambent blue eyes, and a certain sweetness of expression." He served as an army surgeon during the Civil War with great distinction. At the end of 1864 he was ordered to the Surgeon-General's Office. There he had

[1] Virgil, *Aeneid*, Bk. vi, lines 427–429.

charge of matters pertaining to all contract physicians, the organization of the Veteran Reserve Corps, and the accounts of hospitals; he had also the care of the pathological museum. The want of books for consultation was at once felt by him. Fortunately, at the close of the war in 1865 the hospitals turned into the Surgeon-General's Office something like 85,000 dollars of their savings, and this he was allowed to use for the library which began to grow into the great collection the catalogue of which fills many large volumes. What made him so capable was not only originative genius with the power of applying his many mental resources, but above all the group of qualities connoted by the word "character." Dr. Weir Mitchell recalls a few words said to him by Billings not many weeks before he died. He was asked how many degrees he had received, and when they began to count the LL.D.'s and B.C.L.'s, he laughed and said, "Yes, that is my principal title to be considered a man of letters."

Sir WILLIAM OSLER said that as a medical bibliographer he occupied a unique position. Even as a young man he expressed an aspiration "to establish for the use of American physicians a fairly complete library, and in connexion with this to prepare a comprehensive catalogue and index which should spare medical teachers and writers the drudgery of consulting 10,000 or more different indexes, or turning over the leaves of as many volumes to find a dozen or so references of which they might be in search." The opportunity came when he was assigned to duty in the Surgeon-General's office. Supported in his efforts by successive Surgeons-General and liberal grants from Congress, Billings was able in a few years to collect one of the largest and most complete medical labraries in the world. When he retired in 1895 there were 308,445 volumes and pamphlets and 4,335 portraits. At the present time the library is the largest of its kind in the world, containing upwards of half a million volumes and more than 5,000 portraits. A single-volume catalogue was issued in 1872, a three-volume in 1873–74, and in 1876 Billings's great plan took shape in a specimen fasciculus of a new catalogue. After four years of hard work, in which he was greatly helped by Robert Fletcher, vol. i. of the *Index Catalogue* was issued, and afterwards, year by year, volumes appeared with remarkable regularity, and in 1895 Series I was completed—fifteen great volumes, each of nearly one thousand pages. The second series was now rapidly approaching completion. While the *Catalogue* only represented the contents of the Surgeon-General's Library, it was really an exhaustive index of medical literature. All departments of medicine were represented, and there was not a subject, and scarcely an author of note, ancient or modern, not in the *Catalogue*. Sir William Osler gave a remarkable example of its completeness. A few years ago Dr. Aldis Wright, of Cambridge, asked him if he could help in finding certain references to obscure medical writers mentioned in Burton's *Anatomy of Melancholy*, the references in which he was tracking to their sources. No trace of those he wanted were in British libraries; every one was in the Surgeon-General's Library. "Take any subject you wish," said Sir William Osler, "from dreams to dizziness, from coprolalia to suicide, the literature is given in a full and systematic manner. If you desire to look up the biography of any man in medicine or science, from Hippocrates to Koch, the dates are there, and the necessary information." In the many thousands of references he had made to the volume, Sir William Osler said he had noted not more than one or two mistakes.

In an address by Mr. RICHARD R. BOWKER, Editor of the *Library Journal*, he said that years ago Oliver Wendell Holmes, describing a visit of Dr. Billings to his private library in Cambridge, told how he came into the room, looked round, darted at a book which was the most valuable volume on the shelves, examined it, replaced it, took another survey, and made tracks for a second book which was the second most valuable book in the collection. Holmes with a twinkling eye added: "Why, Sir, Dr. Billings is a bibliophile of such eminence that I regard him as a positive danger to the owner of a library if he is ever let loose in it alone." And his library work by no means exhausted the energies of Billings. He was a recognized authority on hospital construction, the foremost American vital statistician, and a professor of hygiene in two universities. When he had left the army he was called from the chair of hygiene in the University of Pennsylvania to the directorship of the New York Public Library on the Astor, Lenox, and Tilden Foundations. There he changed what had been almost a chaos into a well organized and co-ordinated system. Two years ago his work was crowned by the completion of a magnificent building in which a million volumes are stored, with a staff of nearly 1,000 persons throughout the branches. To understand the man's strength of character it should be said that he had been twice operated on for cancer. In the latter years of his life he was probably seldom without pain, and sleep was to a great extent denied him. Yet all this never seemed to interfere with his work, and he still read a novel or two after the day's work as the "best of soporifics."

It is a wonderful career, beginning as assistant to a travelling showman, and ending as a man held in the highest honour by the profession throughout the world, who had won his way to the foremost place in many different fields of activity.

BRITISH ASSOCIATION.

THE eighty-third annual meeting of the British Association for the Advancement of Science opened on Wednesday, September 10th, at Birmingham. The number of members and associates registered on the first day was 2,506; the total attendance is expected to be about 3,000.

President's Address.

The President (Sir OLIVER LODGE) took for the subject of his address, "Continuity," with the motto *Natura non vincitur nisi parendo*. Naturally the address as coming from a distinguished physicist dealt mostly with what may be called the higher physics. It was, therefore, for the most part highly technical. In the following abstract only such points as may interest our readers are given. He began by asking what, limiting ourselves to a scrutiny on the side of pure science alone, in the main, was the characteristic of the promising though perturbing period in which we lived? The answer he ventured to give was—rapid progress, combined with fundamental scepticism. Rapid progress was not characteristic of the latter half of the nineteenth century—at least not in physics. Fine solid dynamical foundations were laid, and the edifice of knowledge was consolidated; but wholly fresh ground was not being opened up, and totally new buildings were not expected. With the realization of predicted ether waves in 1888, the discovery of x rays in 1895, spontaneous radio-activity in 1896, and the isolation of the electron in 1898, expectation of further achievement became vivid; and novelties—experimental, theoretical, and speculative—have been showered upon us ever since this century began. That is why he spoke of rapid progress. Of the progress he would say little—there must always be some uncertainty as to which particular achievement permanently contributed to it; but he would speak about the fundamental scepticism. He explained that he did not mean the well-worn and almost antique theme of theological scepticism; that controversy was practically in abeyance just now. At any rate, the major conflict was suspended; the forts behind which the enemy had retreated did not invite attack. It was the scientific allies now who were waging a more or less invigorating conflict among themselves, with philosophers joining in. Meanwhile the ancient foe was biding his time and hoping that from the struggle something would emerge of benefit to himself. Some positions, he felt, were too hastily abandoned and might perhaps be retrieved; or, to put it without metaphor, it seemed possible that a few of the things prematurely denied, because asserted on inconclusive evidence, might after all, in some form or other, have really happened. Thus the old theological bitterness is mitigated, and a temporizing policy was either advocated or instinctively adopted. He proceeded to indicate the kind of dominating controversies now extant, employing as far as possible only a single word in each case so as to emphasize the necessary brevity and insufficiency of the reference. In physiology the conflict ranges round *vitalism;* in chemistry the debate concerned *atomic structure;* in biology the dispute was on the laws of *inheritance*. Besides these major controversies, debate was active in other sections: In education, *curricula* generally were being overhauled or fundamentally criticized,

and revolutionary ideas were promulgated concerning the advantages of freedom for infants. In economic and political science, or sociology, what was there that was not under discussion? Not property alone, nor land alone, but everything—back to the garden of Eden and the inter-relations of men and women. Lastly, in the vast group of mathematical and physical sciences, present-day scepticism concerned what, if he had to express it in one word, he would call "continuity." Still more fundamental and deep-rooted than any of these sectional debates, however, a critical examination of scientific foundations generally was going on; and a kind of philosophic scepticism was in the ascendant, resulting in a mistrust of purely intellectual processes and in a recognition of the limited scope of science. The fact was that some of the best things are, by abstraction, excluded from science, though not from literature and poetry; hence perhaps an ancient mistrust or dislike of science, typified by the Promethean legend. Science is systematized and metrical knowledge, and in regions where measurement could not be applied it had small scope.

Emotion and intuition and instinct were immensely older than science, and in a comprehensive survey of existence they could not be ignored. Scientific men might rightly neglect them, in order to do their proper work, but philosophers could not. So philosophers had begun to question some of the larger generalizations of science, and to ask whether in the effort to be universal and comprehensive, scientific investigators had not extended their laboratory inductions too far. The conservation of energy, for instance—was it always and everywhere valid: or might it under some conditions be disobeyed? It would seem as if the second law of thermodynamics must be somewhere disobeyed—at least if the age of the universe was both ways infinite—else the final consummation would have already arrived. Not by philosophers only, but by scientific men also, ancient postulates were being pulled up by the roots. Physicists and mathematicians were beginning to consider whether the long known and well-established laws of mechanics held true everywhere and always, or whether the Newtonian scheme must be replaced by something more modern, something to which Newton's laws of motion are but an approximation. Indeed, a whole system of non-Newtonian mechanics had been devised, having as its foundation the recently discovered changes which must occur in bodies moving at speeds nearly comparable with that of light. It turned out, in fact, that both shape and mass are functions of velocity. As the speed increased the mass increased and the shape was distorted, though under ordinary conditions only to an infinitesimal extent. So far we agreed; we agreed with the statement of fact; but we did not consider it so revolutionary as to overturn Newtonian mechanics. After all, a variation of mass was familiar enough, and it would be a great mistake to say that Newton's second law broke down merely because mass was not constant. That mass was constant was only an approximation. That mass was equal to ratio of force and acceleration was a definition and could be absolutely accurate. It held perfectly even for an electron with a speed near that of light; and it was by means of Newton's second law that the variation of mass with velocity had been experimentally observed and compared with theory. He urged that they should remain with or go back to Newton. He saw no reason against retaining all Newton's laws, discarding nothing, but supplementing them in the light of further knowledge. A still deeper variety of comprehensive scepticism existed, and it was argued that all our laws of Nature, so laboriously ascertained and carefully formulated, were but conventions after all, not truths; that we had no faculty for ascertaining real truth, that our intelligence was not evolved for any such academic purpose; that all we could do was to express things in a form convenient for present purposes and employ that mode of expression as a tentative and pragmatically useful explanation. Even explanation, however, had been discarded as too ambitious by some men of science, who claimed only the power to describe. They not only emphasized the How rather than the Why—as was in some sort inevitable, since explanations were never ultimate—but were satisfied with very abstract propositions, and regarded mathematical equations as preferable to, because safer than, mechanical analogies or models. One thing was very notable—that it was closer and more exact knowledge that had led to the kind of scientific scepticism now referred to; and that the simple laws on which they used to be working were thus simple and discoverable because the full complexity of existence was tempered to their ken by the roughness of their means of observation.

In most parts of physics simplicity had sooner or later to give place to complexity, though certainly he urged that the simple laws were true, and were still true, as far as they went, their inaccuracy being only detected by further real discovery. The reason they were departed from became known to them; the law was not really disobeyed, but was modified through the action of a known additional cause. Hence it was all in the direction of progress. If they had to summarize the main trend of physical controversy at present, he felt inclined to urge that it largely turned on the question as to which way ultimate victory lay in the fight between continuity and discontinuity. The modern tendency was to emphasize the discontinuous or atomic character of everything. Matter had long been atomic, in the same sense as anthropology was atomic; the unit of matter is the atom, as the unit of humanity is the individual. Whether men or women or children, they could be counted as so many "souls." And atoms of matter could be counted too. Certainly, however, there was an illusion of continuity. They recognized it in the case of water. It appeared to be continuous medium, and yet it was certainly molecular. It was made continuous again, in a sense, by the ether postulated in its pores, for the ether was essentially continuous. Electricity itself—that was to say, electric charge—had proved itself to be atomic. Even magnetism had been suspected of being atomic, and its hypothetical unit had been named in advance "the magneton": but he confessed that there he had not been shaken out of the conservative view. Biology might be said to be becoming atomic. It had long had natural units in the shape of cells and nuclei, and some discontinuity represented by body-boundaries and cell-walls; but now, in its laws of heredity as studied by Mendel, number and discontinuity were strikingly apparent among the reproductive cells, and the varieties of offspring admit of numerical specification and prediction to a surprising extent; while modification by continuous variation, which seemed to be of the essence of Darwinism, gave place to, or at least was accompanied by, mutation, with finite and considerable and in appearance discontinuous change. So far from Nature not making jumps, it became doubtful if she did anything else. Her hitherto placid course, more closely examined, seemed to look like a kind of steeplechase. Yet undoubtedly continuity was the backbone of evolution, as taught by all biologists — no artificial boundaries or demarcations between species —a continuous chain of heredity from far below the amoeba up to man. Actual continuity of undying germ-plasm, running through all generations, was taught likewise; though a strange discontinuity between this persistent element and its successive accessory body-plasms—a discontinuity which would convert individual organisms into mere temporary accretions or excretions, with no power of influencing or conveying experience to their generating cells—was advocated by one school. In all the debateable matters of which he had indicated possibilities he wanted to urge a conservative attitude. He accepted the new experimental results on which some of these theories—such as the principle of relativity—were based, and was profoundly interested in them, but he did not feel that they were so revolutionary as their propounders thought. He saw a way to retain the old and yet embrace the new, and he urged moderation in the uprooting and removal of landmarks. Of these the chief was continuity. He could not imagine the exertion of mechanical force across empty space, no matter how minute; a continuous medium seemed to him essential. He could not admit discontinuity in either space or time; nor could he imagine any sort of experiment which would justify such a hypothesis. What about the ether? Was that an abstraction or a mere convention, or was it a concrete physical entity on which they could experiment? It had to be admitted that it was exceedingly difficult to make experiments on the ether. It did not appeal to sense, and they know no means of getting hold of it. The one thing they knew

metrical about it was the velocity with which it could transmit transverse waves. That was clear and definite, and thereby to his judgement it proved itself a physical agent; not, indeed, tangible or sensible, but yet concretely real. But it did elude our laboratory grasp. If they rapidly moved matter through it, hoping to grip it and move it too, they failed: there was no mechanical connexion. Hence arose the idea that motion with respect to ether was meaningless; and the fact that only relative motion of pieces of matter with respect to each other had so far been observed is the foundation of the principle of relativity. Sir Oliver Lodge went on to say that men were now living in an epoch of some very comprehensive generalizations. "The physical discovery of the twentieth century, so far, is the Electrical Theory of Matter." The theory was bound to have curious consequences; and already it had contributed to some of the uprooting and uncertainty he had spoken of. For, if it were true, every material interaction would be electrical—that is, ethereal—and hence arose their difficulty. Every kind of force was transmitted by the ether; and hence, so long as all other apparatus was travelling together at one and the same pace, they had no chance of detecting the motion. That was the strength of the principle of relativity. The changes were not zero, but they cancelled each other out of observation.

It was the extreme omnipresence and uniformity and universal agency of the ether of space that made it so difficult to observe. To observe anything one must have differences. If all actions at a distance were conducted at the same rate through the ether, the travel of none of them could be observed. Find something not conveyed by the ether and there was a chance. But then every physical action was transmitted by the ether, and in every case by means of its transverse or radiation-like activity. Except perhaps gravitation. That might give a clue some day, but at present they had not been able to detect its speed of transmission at all. No plan had been devised for measuring it. Nothing short of the creation or destruction of matter seemed likely to serve; creation or destruction of the gravitational unit, whether it were an atom or an electron or whatever it was. Most likely the unit of weight is an electron, just as the unit of mass was.

Speaking as a physicist he must claim the ether as peculiarly the physicists' domain. The study of molecules they shared with the chemist, and matter in its various forms was investigated by all men of science, but a study of the ether of space belongs to physics only. He was not alone in feeling the fascination of this portentous entity. Its curiously elusive and intangible character, combined with its universal and unifying permeance, its apparently infinite extent, its definite and perfect properties, made the ether the most interesting as it was by far the largest and most fundamental ingredient in the material cosmos. The ether of space was at least the great engine of continuity. It might be much more, for without it there could hardly be a material universe at all. Certainly, however, it was essential to continuity; it was the one all-permeating substance that binds the whole of the particles of matter together. And yet it was possible for people to deny its existence, because it was unrelated to any of their senses except sight, and to that only in an indirect and not easily recognized fashion. He held that science was incompetent to make comprehensive denials, even about the ether, and that it went wrong when it made the attempt. Science should not deal in negations; it was strong in affirmations, but nothing based on abstraction ought to presume to deny outside its own region. It often happened that things abstracted from and ignored by one branch of science might be taken into consideration by another.

Thus, chemists ignored the ether; mathematicians might ignore experimental difficulties; physicists ignored and excluded live things; biologists excluded mind and design; psychologists might ignore human origin and human destiny; folk-lore students and comparative mythologists need not trouble about what modicum of truth there might be in the legends which they are collecting and systematizing; and microscopists might ignore the stars. Yet none of these ignored things should be denied. Denial was no more infallible than assertion. There were cheap and easy kinds of scepticism, just as there were cheap and easy kinds of dogmatism; in fact, scepticism could become viciously dogmatic, and science had to be as much on its guard against personal predilection in the negative as in the positive direction. An attitude of universal denial may be very superficial.

All intellectual processes were based on abstraction. For instance, history must ignore a great multitude of facts in order to treat any intelligently: it selected. So did art; and that was why a drawing was clearer than reality. Science made a diagram of reality, displaying the works, like a skeleton clock. Anatomists dissected out the nervous system, the blood vessels, and the muscles, and depicted them separately—there must be discrimination and intellectual grasp—but in life they were all merged and co-operating together; they did not really work separately, though they might be studied separately. A scalpel discriminated: a dagger or a bullet crashed through everything. That was life—or rather death. The laws of Nature were a diagrammatic framework, analysed or abstracted out of the full comprehensiveness of reality. Hence it was that science has no authority in denials. To deny effectively needed much more comprehensive knowledge than to assert. And abstraction was essentially not comprehensive: one could not have it both ways. Science employed the methods of abstraction and thereby made its discoveries.

The reason why some physiologists insisted so strenuously on the validity and self-sufficiency of the laws of physics and chemistry, and resisted the temptation to appeal to unknown causes—even though the guiding influence and spontaneity of living things were occasionally conspicuous as well as inexplicable—was that they were keen to do their proper work; and their proper work was to pursue the laws of ordinary physical energy into the intricacies of "colloidal electrolytic structures of great chemical complexity" and to study its behaviour there. What must clearly be grasped, on their testimony, was that for all the terrestrial manifestations of life the ordinary physical and chemical processes had to serve. There were not new laws for living matter, and old laws for non-living: the laws were the same; or if ever they differed, the burden of proof rested on him who sustained the difference. The conservation of energy, the laws of chemical combination, the laws of electric currents, of radiation, etc., etc.—all the laws of chemistry and physics—might be applied without hesitation in the organic domain. Whether they were sufficient was open to question, but as far as they went they were necessary; and it is the business of the physiologist to seek out and demonstrate the action of those laws in every vital action.

The President went on to say that by some critics he had been called a vitalist, and in a sense he was; but he was not a vitalist if vitalism meant an appeal to an undefined "vital force" (an objectionable term he had never thought of using) as against the laws of chemistry and physics. Those laws must be supplemented, but need by no means be superseded. The business of science was to trace out their mode of action everywhere as far and as fully as possible; and it was a true instinct which resented the mediaeval practice of freely introducing spiritual and unknown causes into working science. In science an appeal to occult qualities must be illegitimate, and be a barrier to experiment and research generally; as when anything was called an Act of God—and when no more was said. The occurrence was left unexplained. To attribute the rise of sap to vital force would be absurd; it would be giving up the problem and stating nothing at all. The way in which osmosis acted to produce the remarkable and surprising effect was discoverable and has been discovered. So it was always in science, and its progress began when unknown causes were eliminated and treated as non-existent. Those causes, so far as they existed, must establish their footing by direct investigation and research; carried on in the first instance apart from the long recognized branches of science, until the time when they too have become sufficiently definite to be entitled to be called scientific.

It was well for people to understand this definite limitation of scope quite clearly, else they wrested the splendid work of biologists to their own confusion, helped, it was true, by a few of the more robust or less responsible theorizers, among those who should be better informed and more carefully critical in their philosophizing utterances.

But, as was well known, there were more than a few biologists who, when taking a broad survey of their subject, clearly perceived and taught that before all the actions of live things were fully explained some hitherto excluded causes must be postulated. Ever since the time of J. R. Mayer it had been becoming more and more certain that, as regards performance of work, a living thing obeyed the laws of physics, like everything else; but undoubtedly it initiated processes and produced results that without it could not have occurred—from a bird's nest to a honeycomb, from a deal box to a warship. The behaviour of a ship firing shot and shell was explicable in terms of energy, but the discrimination which it exercised between friend and foe was not thus explicable. There was plenty of physics and chemistry and mechanics about every vital action, but for a complete understanding of it something beyond physics and chemistry was needed. And life introduced an incalculable element. He would risk the assertion that life introduced something incalculable and purposeful amid the laws of physics: it thus distinctly supplemented those laws, though it left them otherwise precisely as they were and obeyed them all. They saw only its effect, they did not see life itself. Conversion of inorganic into organic was effected always by living organisms. The conversion under those conditions certainly occurred, and the process might be studied. Life appeared necessary to the conversion; which clearly took place under the guidance of life, though in itself it was a physical and chemical process. Many laboratory conversions took place under the guidance of life, and, but for the experimenter, would not have occurred.

Again, putrefaction, and fermentation, and purification of rivers, and disease, were not purely and solely chemical processes. Chemical processes they were, but they were initiated and conducted by living organisms. Just when medicine was becoming biological, and when the hope of making the tropical belt of the earth healthily habitable by energetic races was attracting the attention of people of power, philosophizing biologists should not attempt to give their science away to chemistry and physics. Biology is an independent science, and was served, not dominated, by chemistry and physics.

Scientific men were hostile to superstition, and rightly so, for a great many popular superstitions were both annoying and contemptible; yet occasionally the terms might be wrongly applied to practices of which the theory was unknown. To a superficial observer some of the practices of biologists themselves must appear grossly superstitious. To combat malaria Sir Ronald Ross did not indeed erect an altar; he oiled a pond—making libation to its presiding genii. What could be more ludicrous than the curious and evidently savage ritual, insisted on by United States officers, as that hygienically splendid achievement the Panama Canal—the ritual of punching a hole in every discarded tin, with the object of keeping off disease! What more absurd, again—in superficial appearance—than the practice of burning or poisoning a soil to make it extra fertile!

Biologists in their proper field were splendid, and their work aroused keen interest and enthusiasm in all whom they guided into their domain. Most of them did their work by intense concentration, by narrowing down their scope, not by taking a wide survey or a comprehensive grasp. Suggestions of broader views and outlying fields of knowledge seemed foreign to the intense worker, and he resented them. For his own purpose he wished to ignore them, and practically he might be quite right. The folly of negation was not his, but belonged to those who misinterpreted or misapplied his utterances, and took him as a guide in a region where, for the time at least, he was a stranger. Not by such aid was the universe in its broader aspects to be apprehended. If people in general were better acquainted with science they would not make these mistakes. They would realize both the learning and the limitations—make use of the one and allow for the other, and not take the recipe of a practical worker for a formula wherewith to interpret the universe.

What appeared to be quite certain was that there could be no terrestrial manifestation of life without matter. Hence naturally they say, or they approve such sayings as, "I discern in matter the promise and potency of all forms of life." Of all terrestrial manifestations of life, certainly. How else could it manifest itself save through matter? "I detect nothing in the organism but the laws of Chemistry and Physics," it was said. Naturally enough. That was what they were after; they were studying the physical and chemical aspects or manifestations of life. But life itself—life and mind and consciousness—they were not studying, and they excluded them from their purview. Matter was what appealed to their senses here and now; Materialism was appropriate to the material world; not as a philosophy but as a working creed, as a proximate and immediate formula for guiding research. Everything beyond that belonged to another region, and must be reached by other methods. To explain the psychical in terms of physics and chemistry was simply impossible; hence there was a tendency to deny its existence, save as an epiphenomenon. But all such philosophizing was unjustified, and was really bad metaphysics. But although life and mind might be excluded from physiology, they were not excluded from science. Of course not. It was not reasonable to say that things necessarily eluded investigation merely because they did not knock against them. Yet the mistake was sometimes made. The ether made no appeal to sense, therefore some were beginning to say that it did not exist. Mind was occasionally put into the same predicament. Life was not detected in the laboratory, save in its physical and chemical manifestations; but they might have to admit that it guided processes nevertheless. It might be called a catalytic agent.

To understand the action of life itself, the simplest plan was not to think of a microscopic organism, or any unfamiliar animal, but to make use of their own experience as living beings. Any positive instance served to stem a comprehensive denial; and if the reality of mind and guidance and plan are denied because they made no appeal to sense, then they should think how the world would appear to an observer to whom the existence of men was unknown and undiscoverable, while yet all the laws and activities of Nature went on as they did now. Suppose, then, that *man* made no appeal to the senses of an observer of this planet. Suppose an outside observer could see all the events occurring in the world, save only that he could not see animals or men. He would describe what he saw much as they had to describe the activities initiated by life. If he looked at the Firth of Forth, for instance, he would see piers arising in the water, beginning to sprout, reaching across in strange manner till they actually joined or were joined by pieces attracted up from below to complete the circuit (a solid circuit round the current). He would see a sort of bridge or filament thus constructed, from one shore to the other, and across the bridge insect-like things crawling and returning for no very obvious reason. If told concerning either of these structures that an engineer had anything to do with it, the idea would be preposterous. One conclusive argument was final against such a superstitious hypothesis—he was not there, and a thing plainly could not act where it was not. But although they, with their greater advantages, perceived that the right solution for such an observer would be the recognition of some unknown agency or agent, it must be admitted that an explanation in terms of a vague entity called vital force would be useless, and might be so worded as to be misleading; whereas a statement in terms of mechanics and physics could be clear and definite and true as far as it went, though it must necessarily be incomplete. What they observed in such understood cases, was an interaction of mind and matter; not parallelism nor epiphenomenalism nor anything strained or difficult, but a straightforward utilization of the properties of matter and energy for purposes conceived in the mind, and executed by muscles guided by acts of will. But it would be said that was unfair, for they knew that there was design in the Forth Bridge, they had seen the plans and understood the agencies at work; they knew that it was conceived and guided by life and mind; it was unfair to quote this as though it could simulate an automatic process. Not at all, said the extreme school of biologists whom he was criticizing, or ought to say if they were consistent; there was nothing but chemistry and physics at work anywhere; and the mental activity apparently demonstrated by these structures was only an illusion, an epiphenomenon; the laws of chemistry and physics were supreme, and they were sufficient to account

for everything! These laws did account for things up to a point; they accounted in part for the colour of a sunset, for the majesty of a mountain peak, for the glory of animate existence. But did they account for everything completely? Did they account for our own feeling of joy and exaltation, for our sense of beauty, for the manifest beauty existing throughout Nature? Did not these things suggest something higher and nobler and more joyous, something for the sake of which all the struggle for existence went on?

Surely there must be a deeper meaning involved in natural objects. Orthodox explanations were only partial, though true as far as they go. When they examined each parti-coloured pinnule in a peacock's tail, or hair in a zebra's hide, and realized that the varying shades on each were so placed as to contribute to the general design and pattern, it became exceedingly difficult to explain how this organized co-operation of parts, this harmonious distribution of pigment cells, had come about on merely mechanical principles. It would be as easy to explain the sprouting of the cantilevers of the Forth Bridge from its piers, or the flocking of the stones of the Nile Dam by chemiotaxis. Flowers attracted insects for fertilization; and fruit tempts animals to eat in order to carry seeds. But these explanations could not be final.

They had still to explain the insects. So much beauty could not be necessary merely to attract their attention. They had further to explain this competitive striving towards life. Why did things struggle to exist? Surely the effort must have some significance, the development some aim. They thus reached the problem of existence itself, and the meaning of evolution.

The mechanism whereby existence entrenched itself is manifest, or at least has been to a large extent discovered. Natural Selection was a *vera causa*, so far as it went; but if so much beauty was necessary for insects, what about the beauty of a landscape or of clouds? What utilitarian object did those subserve? Beauty in general was not taken into account by science. That might be all right, but it existed nevertheless. It was not his function to discuss it, but it was his function to remind them and himself that their studies did not exhaust the universe, and that if they dogmatized in a negative direction and said that they could reduce everything to physics and chemistry, they gibbetted themselves as ludicrously narrow pedants, and were falling far short of the richness and fullness of their human birthright.

Superficially and physically they were very limited. Their sense organs were adapted to the observation of matter, and nothing else directly appealed to them. Their nerve-muscle system was adapted to the production of motion in matter in desired ways, and nothing else in the material world could they accomplish. Their brain and nervous systems connected them with the rest of the physical world. Their senses gave them information about the movements and arrangements of matter. Their muscles enabled them to produce changes in those distributions. That was their equipment for human life; and human history was a record of what they had done with these parsimonious privileges.

If they had learnt from science that evolution was real, they had learnt a great deal. Surely evolution was not an illusion; surely the universe progressed in time. Time and space and matter were abstractions, but were none the less real; they were data given by experience; and time was the keystone of evolution. The only way to refute or confuse the theory of evolution was to introduce the subjectivity of time. That theory involved the reality of time, and it was in that sense that Professor Bergson used the great phrase "creative evolution." He saw the whole of material existence as a steady passage from past to future, only the single instant which they called the present being actual. The past was not non-existent, however; it was stored in their memories, there was a record of it in matter, and the present was based upon it; the future was the outcome of the present, and was the product of evolution. Existence was like the output from a loom. The pattern, the design for the weaving, was in some sort "there" already; but, whereas their looms were mere machines, once the guiding cards had been fed into them, the loom of time was complicated by a multitude of free agents who could modify the web, making the product more beautiful or more ugly according as they were in harmony or disharmony with the general scheme. He ventured to maintain that manifest imperfections were thus accounted for, and that freedom could be given on no other terms, nor at any less cost. The ability thus to work for weal or woe was no illusion; it was a reality, a responsible power which conscious agents possess; wherefore the resulting fabric was not something preordained and inexorable, though by wide knowledge of character it might be inferred.

That evolutionary progress was real was a doctrine of profound significance, and their efforts at social betterment are justified because they were a part of the scheme, a part that had become conscious, a part that realized, dimly at any rate, what it was doing and what it was aiming at. Planning and aiming were therefore not absent from the whole, for they were a part of the whole, and we are conscious of them in ourselves. Either they were immortal beings or they were not. They might not know their destiny, but they must have a destiny of some sort. Those who made denials are just as likely to be wrong as those who made assertions; in fact, denials were assertions thrown into negative form. He was one of those who thought that the methods of science were not so limited in their scope as had been thought: that they could be applied much more widely, and that the psychic region could be studied and brought under law too. Let them anyhow be allowed to make the attempt. Let those who preferred the materialistic hypothesis by all means develop their thesis as far as they could; but let them try what they could do in the psychical region, and see which won.

Although he was speaking *ex cathedra*, as one of the representatives of orthodox science, he would not shrink from a personal note summarizing the result on our own mind of thirty years' experience of psychical research, begun without predilection—indeed with the usual hostile prejudice. That was not the place to enter into details or to discuss facts scorned by orthodox science, but he could not help remembering that an utterance from that chair was no ephemeral production, for it remained to be criticized by generations yet unborn.

In justice to himself and his co-workers, he must risk annoying his present hearers, not only by leaving on record their conviction that occurrences now regarded as occult could be examined and reduced to order by the methods of science carefully and persistently applied, but by going further and saying, with the utmost brevity, that already the facts so examined had convinced him that memory and affection were not limited to that association with matter by which alone they could manifest themselves here and now, and that personality persisted beyond bodily death. The evidence to his mind went to prove that discarnate intelligence, under certain conditions, might interact with them on the material side, thus indirectly coming within their scientific ken; and that gradually they might hope to attain some understanding of the nature of a larger, perhaps ethereal, existence, and of the conditions regulating intercourse across the chasm. A body of responsible investigators had even now landed on the treacherous but promising shores of a new continent.

The methods of science were not the only way, though they were their way of arriving at truth. "*Uno itinere non potest perveniri ad tam grande secretum.*" In conclusion the President said: Many scientific men still feel in pugnacious mood towards theology, because of the exaggerated dogmatism which our predecessors encountered and overcame in the past. They had to struggle for freedom to find truth in their own way; but the struggle was a miserable necessity, and has left some evil effects. And one of them is this lack of sympathy, this occasional hostility, to other, more spiritual forms of truth. We cannot really and seriously suppose that truth began to arrive on this planet a few centuries ago. The pre-scientific insight of genius—of poets and prophets and saints—was of supreme value, and the access of those inspired seers to the heart of the universe was profound. But the camp followers, the scribes and pharisees, by whatever name they may be called, had no such insight, only a vicious or a foolish obstinacy; and the prophets of a new era were stoned.

Now at last we of the new era have been victorious; we inherit the fruits of the age-long conflict, and the stones

are in our hands. Let us not fall into the old mistake of thinking that ours is the only way of exploring the multifarious depths of the universe, and that all others are worthless and mistaken. The universe is a larger thing than we have any conception of, and no one method of search will exhaust its treasures.

Men and brethren, we are trustees of the truth of the physical universe as scientifically explored: let us be faithful to our trust.

Genuine religion has its roots deep down in the heart of humanity and in the reality of things. It is not surprising that by our methods we fail to grasp it: the actions of the Deity make no appeal to any special sense, only a universal appeal; and our methods are, as we know, incompetent to detect complete uniformity. There is a principle of relativity here, and unless we encounter flaw or jar or change, nothing in us responds; we are deaf and blind, therefore, to the immanent grandeur around us, unless we have insight enough to appreciate the whole, and to recognize in the woven fabric of existence, flowing steadily from the loom in an infinite progress towards perfection, the ever-growing garment of a transcendent God.

ROYAL MEDICAL BENEVOLENT FUND.

At the August meeting of the Committee 25 cases were considered and grants amounting to £238 made to 23 of the applicants.

1. Widow, aged 57, of M.R.C.S. Quite unprovided for at recent death of husband and dependent on sons who at present cannot entirely support her. Voted £10.

2. Widow, aged 42, of L.S.A. No income; endeavouring to support herself by taking boarders. Three children, the eldest earning about 15s. a week and the two younger dependent. Voted £10.

3. L.R.C.P.Edin., aged 84. Has practised in London for more than fifty years and being too old for panel work has lost the majority of his patients. Voted £12.

4. M.R.C.S., aged 81. Used to have a good practice in London, but lost his sight some years ago and during his enforced retirement has unavoidably exhausted his savings. Children only able to give slight help. Voted £12.

5. Daughter, aged 67, of late M.D.Edin. Only certain income an annuity of £13, and is in such poor health that occupation is impossible. Voted £12.

6. Widow, aged 38, of L.R.C.P. Since husband's death six years ago has supported herself and her daughter, aged 8, by massage; now asks for a little help owing to an unavoidable increase in expenses. Voted £6.

7. Widow, aged 84, of M.R.C.S. Used to be comfortably off but entrusted her money to a relation who died six months ago and was found to be insolvent. Is given a home by a daughter. Voted £5.

8. Son, aged 13, of late L.R.C.P.Edin. Lost his father eighteen months ago from phthisis and his mother quite recently from new growth. Entirely dependent on relations who can ill afford to help. Voted £12.

9. Daughter, aged 49, of late M.R.C.S. No income, and, being a chronic invalid, is dependent on brothers whose earnings are small. Voted £6.

10. Widow, aged 63, of L.R.C.P.Edin. Since husband's death several years ago has supported herself by taking boarders, but now suffers from a grave complaint and is quite unfit for occupation. Slight help from children. Voted £12.

11. Daughter, aged 63, of late M.R.C.S. Lost her capital owing to the failure of a bank several years ago, and is practically dependent on friends whose contributions are precarious and may cease. Is a confirmed invalid and often suffers great pain. Voted £12.

12. Widow, aged 76, of M.R.C.S. Quite unprovided for at recent death of husband, and is applying for an old age pension. Voted £18.

13. Widow, aged 50, of M.B., C.M.Glasg. Income small, and is obliged to ask for a little help towards the heavy expenses consequent upon her husband's death. Voted £5.

14. Wife, aged 45, of M.B., B.Ch.Oxon. Was deserted about ten years ago and supports herself by nursing, but asks for a little assistance towards expenses incurred for her daughter, aged 13, who has been in bad health for the last eighteen months. Voted £10.

15. Widow, aged 56, of M.D. Has supplemented the help given by children, whose earnings are very small, by giving music lessons, but now, being in failing health, is obliged to ask for assistance. Voted £12.

16. Daughter, aged 64, of late M.R.C.S. Maintained herself for many years by dispensing, but is now dependent on precarious earnings from wood carving, etc. Relieved seven times, £70. Voted £10.

17. Daughter, aged 74, of a surgeon who used to be in the Scots Guards. Was left amply provided for, but lost everything through the defalcations of her trustee, and now has only two small annuities, one purchased by friends, the other from a charitable society. Relieved once £10. Voted £10.

18. Widow, aged 34, of L.R.C.P. Is a nurse matron at a good school for girls, but wants help to maintain herself and daughter, aged 10, during the holidays. Relieved once, £10. Voted £10.

19. Daughter, aged 70, of late M.R.C.S. Only income an old age pension of 5s. a week. Relieved five times, £60. Voted £12.

20. Widow, aged 43, of M.B., C.M.Aberd. Lives rent free as a housekeeper, and receives a few shillings a week as salary, but is unable to meet the holiday expenses of her two children, one of whom is at Christ's Hospital. Relieved six times, £58. Voted £10.

21. Widow, aged 56, of L.F.P.S.Glasg. Small earnings by writing, etc., and slight help from friends. Two children, the younger still dependent. Relieved eight times, £82. Voted £10.

22. Daughter, aged 57, of late M.R.C.S. Is a trained nurse, but has been incapacitated for the last eighteen months, and has now exhausted her small savings. Relieved once, £10. Voted £10.

23. Daughter, aged 57, of late M.R.C.S. Used to maintain herself as nurse-companion, but has suffered from a chronic complaint for some years past, and is now practically incapacitated. Relieved eleven times, £109. Voted £12.

Contributions may be sent to the Honorary Treasurer, Dr. Samuel West, 11, Chandos Street, Cavendish Square, London, W.

LITERARY NOTES.

MESSRS. CONSTABLE will publish almost immediately the *Life and Letters of Alexander Agassiz*, edited by his son.

Professor Wilhelm Alexander Freund, sometime Professor of Diseases of Women in the University of Strassburg, celebrated his eightieth birthday on August 26th. An autobiographical work by the famous gynaecologist has just appeared.

Messrs. J. and A. Churchill have issued an illustrated guide to their publications under the title, *The Literature of Medicine and Natural Science*. The list of books serves to give an idea of the wide territory of scientific literature covered by the enterprise.

Among other works announced by Mr. Arnold is *Thirty Years in Kashmir*, by Dr. Arthur Neve, who recounts his experiences since taking charge of the Kashmir Mission Hospital at Srinagar in 1882, with special reference to the exploring and mountaineering expeditions to which he has devoted his spare time.

Messrs. T. C. and E. C. Jack will issue new volumes of their People's Books series in September. Amongst these volumes may be noted *Biology*, by Professor W. D. Henderson, *Goethe*, by Professor C. H. Herford, and *Spiritualism*, by J. Arthur Hill.

In the *Arena* for August there is an illustrated article on St. Alban's, a school of great antiquity and almost unique historical interest. It claims to be the oldest educational foundation in England. The first documentary evidence relating thereto is found in the *Gesta Abbatum Mon. Sancti Albani*, where it is stated that Abbot Richard de Albius, who ruled the monastery from 1097 to 1119, sent to the Continent for a man to take charge of the school. There is an illustrated paper by Saint Nihal Singh on the American College for Girls at Constantinople, which has been in existence for a quarter of a century. At present sixty Moslem girls with a hundred and fifty of other nationalities, are being educated there. The course, which is wide, has as its objective the attainment of the B.A. degree. One of the Turkish students, Miss Zaroubi Kavaldjan, took the M.D. degree at Chicago, and is now practising medicine at Adabazar. Mr. F. G. Aflalo contributes a further instalment of his "Travellers' Tales." It is announced that from October onwards the *Arena* is to be amalgamated with the *World's Work*.

M. Ernest Jovy, who has embodied the fruits of much laborious research in his work, entitled *Pascal inédit*, has found among the papers of Vallant, physician to Madame de Sablé, who was also in close relations with Messieurs de Port-Royal, some notes as to the last illness of the illustrious author of the *Lettres provinciales*. Vallant ministered to the dying man, who combined in himself the highest scientific and literary gifts, and several other doctors, notably Brayer, Guénault, Hommets, and Eusèbe Renaudot, were called in consultation. Brayer was chief physician to the King; Guénault had a practice so large

that Boileau complains that he was to be met with everywhere in Paris, splashing the pedestrian as he rode along:

Guénault, sur son cheval, en passant m'éclabousse.

Hommets was the nephew of Hamon, the saintly physician who lived with the recluses of Port-Royal and treated the poor all around; Eusèbe Renaudot was the son of Théophraste, so bitterly hated by Gui Patin and persecuted by the Faculty. Théophraste Renaudot was a man of great enterprise. He founded the first French newspaper, and among the contributors to his gazette was no less a person than Cardinal Richelieu; he established a clinic on the lines of the modern out-patient department. and thus brought on his head the wrath of the Faculty; he also started a registry office. Pascal was freely bled and was treated with large doses of antimonial wine which, in the opinion of M. Jovy, killed him. His indictment of the doctors is severe:

Many disorders of Pascal's health were caused by the singular methods of treatment to which his feeble constitution was subjected; he was the *anima nobilis* on which many disastrous experiments were made and his economy was unable to resist the effects of a dangerous remedy given at an altogether unfavourable moment without any caution, perhaps too often and in too large a quantity and made still more dangerous by some admixture of arsenical elements.

This is only a hypothesis which may find a place beside that of Dr. Just-Navarre, who held that Pascal died of tuberculosis, and that of Dr. Carry, who attributed his death to lead poisoning. As Dr. Maurice Genty, who discusses the case in the *Progrès Médical* of August 16th, says, in retrospective medicine all diagnoses are possible and none of them matter.

The famous mediaeval feminist, Christine de Pisau, who held advanced views on problems which we are apt to regard as peculiarly modern, is said, amongst other things, to have written in favour of co-education. Her contention was that, from the moral as well as from the intellectual standpoint, it is better for boys and girls to grow up side by side instead of being segregated from each other during the impressionable years of childhood. This fourteenth-century writer seems to have anticipated the favourite theories of some of our modern educationalists, for we find the same opinion expressed in an interesting article by Mr. G. F. Burness which appeared in the August number of *The Child*. Mr. Burness, however, is by no means in favour of boys and girls following the same courses in all subjects of the school curriculum. The co-educational system, he tells us, was designed to prepare children to share in later life the activities of the business world should circumstances demand it; but the co-educational school should never be a place where sex rivalry is fostered by forcing boys and girls to compete with each other on the same lines, and where no attention is paid to the peculiar requirements of either sex. On the contrary, it should form a common meeting ground where each may learn to know and respect the qualities and capacities of the other, and where, whilst "the lessons which they share in common in such subjects as English, history, Latin, etc., bring home to them the joys of a common intellectual life, the work which they do apart from each other in the manual shop and in the cookery room is a reminder to them that there is much work that is best done by men, and much also that is specially reserved for the domain of women." In the opinion of the author this constitutes one of the most valuable lessons to be acquired at the co-educational school, a fact which to many may prove a powerful argument in its favour. There will probably always be parents, however, who prefer old-fashioned methods; and for such the education of boys whose health renders them unfit for the rough and tumble of public school life is oftentimes something of a problem. The August number of *The Child* contains an article on this subject by Mr. Philip J. B. Tillard, who gives an interesting description of the school for delicate boys at Bradley Court, Mitcheldean; whilst the same number of this excellent magazine also contains a short article by Mr. A. S. Blundell Bankart on congenital dislocation of the hip, and an account by Mr. G. F. Daniell of the close relations existing between badly printed school books and defective vision in childhood.

At the International Conference on Post-graduate Instruction held in London on August 7th, a report of which appeared in the JOURNAL of August 23rd (p. 504), Professor Emile von Grosz of Budapest gave a historical sketch of the teaching of medicine in Hungary, which, he said, was placed on a sure foundation when the University of Nagyszombat was reorganized by "the King, Maria-Theresa," in 1769. The use of the title "king" by a woman may appear remarkable but in this particular case it is historic, and there are modern instances. Princess Henry of Battenberg is Governor of the Isle of Wight, and the ladies who preside over municipal councils and over meetings are known as "chairmen." The story of Empress Maria-Theresa's title of "king" is told by Carlyle in the *History of Frederick the Great* (Book XIII, chap. v) in two forms, called by him respectively the poetic and the prose form. The former runs as follows:

Presburg, September 21st. This is the date (or chief date, for, alas, there turn out to be two!) of the world-famous *Moriamur pro Rege nostro Mariâ Theresiâ*; of which there are now needed Two Narratives; the generally received (in part mythical) going first, in the following strain:

"The Queen has been in Presburg mainly, where the Hungarian Diet is sitting, ever since her Coronation-ceremony. On the 11th September" (or 11th and 21st together) "the afflicted Lady makes an appearance there, which, for theatrical reality, has become very celebrated. Alas, it is but three months since she galloped to the top of the Königsberg, and cut defiantly with bright sabre towards the Four Points of the Universe; and already it has come to this. Hungarian Magnates in high session, the high Queen enters, beautiful and sad,—and among her Ministers is noticeable a Nurse with the young Archduke, some six months old, a fine thriving child, perhaps too wise for his age, who became Kaiser Joseph II. in after-time.

The Hungarian Session is not on record for me, Hall of meeting, Magyar Parliamentary eloquence unknown; nor is any point conspicuously visible, exact and certain, except these (alas! not even these): That it was the 11th of September; that her Majesty coming forward to speak, took the child in her arms, and there, in a clear and melodiously piercing voice, sorrow and courage on her noble face, beautiful as the moon riding among wet stormy clouds, spake, as the Hungarian Archives still have it, a short Latin Harangue; in substance as follows: ". . . Hostile invasion of Austria; imminent peril, to this Kingdom of Hungary, to our person, to our children, to our crown. Forsaken by all—*ab omnibus derelicti*" (Britannic Majesty himself standing stock-still—blamably, one thinks, the two swords being only at *his* throat, and a good way off!) "I have no resource but to throw myself on the loyalty and help of Your renowned Body, and invoke the ancient Hungarian virtue to rise swiftly and save me!" Whereat the assembled Hungarian Synod, their wild Magyar hearts touched to the core, start-up in impetuous acclaim, flourish aloft their drawn swords, and shout unanimously in passionate tenor-voice, "*Moriamur* (Let us die) for our Rex Maria Theresa!" Which were not vain words. For a general "Insurrection," which is by no means of rebellious nature; and many noblemen, old Count Palfy himself a chief among them, though past threescore and ten, took the field at their own cost; and the noise of the Hungarian Insurrection spread like a voice of hope over all Pragmatic countries.

This "very beautiful heroic scene," as Carlyle calls it, long went about the world, "circulating triumphantly through all hearts for above a Century past." Like so many other fine things in history it seems to be a myth. Carlyle tones the story down to "the following stingy prose pitch." Maria-Theresa, since her Coronation, has had a mixed time of it with her Hungarian Diet. The people though "most consciously chivalrous" was constitutional withal. After much haggling about privileges, taxes, and so forth, on September 11th, 1741, Maria-Theresa summoned them to her Palace and threw herself upon their nobleness. This melted the Hungarian heart a good deal, and produced cheering, tears, and cries of "Life and Fortune to your Majesty!" In this humour the Diet returned to its Session-House and voted the "Insurrection" or general Arming of Hungary in pursuance of her Majesty's implied desire. On September 20th the Grand Duke Franz was elected Co-regent, and at the ceremonial "homagings and oath" taken next day a baby, "fine mutual product of the Two Co-regents," was produced with great effect, the Diet exclaiming that it would give its life and blood (*vitam et sanguinem*) for their Queen and Kingdom. Carlyle adds that it was "some Vienna Pamphleteer of theatrical imaginative turn, finding the thing apt, a year or two afterwards,—who by kneading different dates and objects into one, boldly annihilating time and space, and adding a little paint,—gave it that seductive mythical form. From whom Voltaire adopted it, with improvements, especially in the little Harangue; and from Voltaire gratefully the rest of mankind."

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SATURDAY, SEPTEMBER 13TH, 1913.

CRIMINAL LUNACY.

IN an address delivered before the Section of Forensic Medicine of the seventeenth International Medical Congress, which is published at p. 641, Dr. Nicolson deals, out of the abundance of knowledge gathered in a long and wide experience, with the medical jurisprudence of criminal lunacy. This covers a field of thought in which there has been more nebulous theorizing than almost any other in the whole range of medicine. Criminology has become a veritable Tom Tiddler's ground of science where scraps from the dust-heap of uncritical unverified hypotheses and doubtful "facts" have been dumped by the *a priori* philosopher, the irresponsible and impracticable reformer, and the doctrinaire socialist. To this dust-heap the lawyer has added his cast-iron formulas as to a knowledge of right and wrong, the medical spinner of metaphysical cobwebs his subtleties for the expression of which barbarous Greek words have to be coined, and the sentimentalist his perverted sympathy that would take the sword from the hand of justice and transfer pity from the victim to the criminal. Into this cloudland of obscurity Dr. Nicolson brings the light of a virile common sense that will do much to dispel the darkness almost to be felt in which the subject is at present wrapped.

Experience is the keystone of medicine, as must necessarily be the case in a branch of knowledge that is still largely empirical. But experience is not merely seeing a large number of cases, but noting and understanding the significance of the peculiarities of each. If a man's mind runs in a groove, and he almost automatically attaches a conventional label to the cases that pass before him, his experience is a mere *hortus siccus* of specimens, all of which have the same value. The really experienced man is he who sees that no two cases of disease are exactly alike, and who discerns behind the symptoms the man in his finite variety of mental and physical complexion. *Non multa sed multum* is a maxim which, properly interpreted, applies to medical observation not less than to reading. When, however, the largest opportunities of cultivating a particular field of observation have been taken advantage of; when the trained mind is so sharpened by constant contact with facts of a similar order, though varying widely in the circumstances in which they present themselves, as to give its operations the swiftness and almost the certainty of intuition, experience is raised to its highest power, and is the most effective means of reaching sound conclusions. History was defined by Bolingbroke as philosophy teaching by example; so it may be said of experience that it is wisdom learnt from practical knowledge. Without this neither books nor laboratory research will enable the unwary to escape the pitfalls of error that lie about the feet of every wayfarer in the realm of thought. It is the stamp of an experience, not merely long but ripe and fruitful, that makes Dr. Nicolson's address so valuable a contribution to the subject of which he treats.

He begins by sweeping aside the heredity of crime as "a mythical and dangerous doctrine," and we agree with him that if what may be called criminal predestination be admitted, the philanthropy which aims at rescuing children from surroundings which inevitably tend to make them criminals, is a mere waste of energy. The success with which waifs and strays who, left to themselves would go to swell the ranks of the criminal classes, are turned into useful citizens by being brought under influences which, in Matthew Arnold's phrase, "make for righteousness" is the best proof that the criminal is made not born. He is made by environment, lack of moral discipline, and unfavourable economic conditions. The question whether what Lombroso calls the *reo nato*, the born criminal, exists need not be discussed here. There have been so-called "noble" families of which it could be said with a considerable measure of truth that no man of the stock was honest and no woman chaste. There have also been unhappy children in whom criminal tendencies seemed to be innate, but in most, if not all of such cases, it is probable that the cause is to be found in inherited insanity. We have always held that there is no criminal type; the attempts to construct such a type are not worthy of serious consideration except in as far as they may mislead people and give rise to serious errors of opinion. There is a story of Socrates which serves to point this moral. An Athenian student of physiognomy declared that his countenance bore the mark of every vice. When the disciples of the philosopher resented this opinion Socrates restrained them, saying simply that, in point of fact, he had tendencies to passion, but his disciplined self-control was able to hold them in check.

Dr. Nicolson also summarily dismisses the doctrine that all murderers are insane, a view which, if generally held, would remove the most powerful safeguard of human life against violence. He holds that habitual crime, unlike insanity, is neither a mental condition nor a neurosis, but a business entered upon as a means of making a living. The choice of this business is determined by social environment, and as Dr. Mercier pointed out in the discussion on Crime and Punishment at the Brighton meeting, by the desire to gratify selfish instincts.

Dr. Nicolson makes the important observation that while the criminal tendency in sane persons is towards theft—or as Dr. Mercier would say, "the determination to obtain gratification for oneself regardless of the cost to others"—in the insane it is towards homicide or personal violence. In his address Dr. Nicolson is mainly concerned with the relation of murder to insanity. The decision of the question whether in a given case a person charged with murder is insane often presents difficulties, and these too often manifest themselves in the courts in a manner which does not impress the lawyers or the public with the value of medical testimony. Fortunately we have not had in this country such exhibitions of conflicting opinion as were seen in a notorious case tried not long ago on the other side of the Atlantic; but in our own courts experts do not always agree, and the ordinary practitioner, unless the case is so clear that the cleverest counsel cannot make the worse appear the better reason, may be made to show the uncertainty of medical science in a disagreeable light. Dr. Nicolson thinks that no medical man is fully equipped for the practice of his profession unless he has had some months' experience in an asylum, either before or after he is medically qualified. This seems to us to be a counsel of perfection, which, at least under existing conditions, is almost beyond hope of fulfilment. But every doctor should know something of practical psychology. By this we mean the play of the various passions and the abnormalities engendered

by what the Elizabethans called the "humours" of the human mind. No doctor should go into the box to testify as to the mental state of an accused person with the light heart with which the late M. Emile Ollivier entered on the war with Prussia. Before he appears as a witness he should carefully refresh his memory and bring his professional experience to bear on the problem after seeking counsel of such acknowledged oracles on insanity as are accessible to him.

A great source of difficulty is found in what are conveniently called "borderland" cases. The line of demarcation between sanity and insanity is often ill defined; a man may be, like Hamlet, only mad north-no-th-west, and yet in that partial madness may commit a murder. Robert Louis Stevenson said that a sane spot would be found in most of us if properly looked for. It is the business of the doctor who examines a man charged with murder to endeavour to find out whether there is any insanity in the case; he may probably discover in some of the more obscure mental processes the cause that has led to the crime.

Another source of difficulty to the doctor has been in determining how far mental deficiency has led to crime. In regard to this, Dr. Nicolson says that the Mental Deficiency Act when it comes into operation will make the solution of this problem easier for the doctor. While he sees in that measure an effective means of reducing the number of criminal lunatics, he recognizes also that there is a risk that unquestionably certifiable lunatics may be placed in institutions as mere defectives. Mistakes of this kind are almost unavoidable, but the fact that administration of this part of the measure is to be in the hands of the Commissioners in Lunacy affords the best safeguard in the matter.

The doctor who has to give an opinion in a case in which the defence of insanity is set up, will do well to be guided by the two broad principles laid down by Dr. Nicolson. The first is: That no lunatic should be hanged; the second and correlative principle is that no mere criminal should on the plea of insanity be allowed to escape the due punishment for his guilty deed. The principles are clear enough; the difficulty lies in their right application. It is like steering between Scylla and Charybdis, and it is here that common sense, informed and directed by experience, is a surer guide than all the teaching of what is called "criminal anthropology." The responsibility of formulating an opinion which may send a poor mad creature to the gallows is one which a practitioner who is conscious that he does not possess the special knowledge required to form a right judgement may well be tempted to evade, but he must remember that his duty to society comes before any private sentiment.

Dr. Nicolson tersely describes the range and method of the inquiry into the mental state of an accused person, and he rightly lays the greatest stress on the necessity of seeking for the motive which may have led to the perpetration of the crime. This, as he says, is the *focus* upon which the medical investigation must be directed and centred. The motive may be found in some delusion or some grievance, real or imaginary, which, long nursed, has worked like madness in the brain. Some motives lie hidden so deep in a man's heart that they are almost beyond discovery except by accident. Readers of Maupassant may remember his terrible story of a judge who died in the odour of legal sanctity and who left behind a diary in which he had recorded a number of murders he had done from the mere lust of blood. There are people to whom the destruction of life is a sensual pleasure. As an example may be cited the famous poisoner, Madame de Brinvilliers, who watched with a hideous delight the death agony of her victims. It would, we think, be a dangerous mistake to pronounce all murderers of this kind insane. They are abnormal, but that does not make them irresponsible.

On the other hand the routine test, so long and so obstinately adhered to by many judges, by which an accused person's knowledge of right and wrong was made the criterion of his sanity and responsibility, has, we are glad to note, been discarded as insufficient. On this point Dr. Nicolson quotes an instructive case in which the Court of Criminal Appeal set aside a sentence to death on the strength of the medical evidence, which showed that the condemned man was not in such a state of mind as to make him responsible for his act. Many insane women who commit infanticide know that they have done wrong, but the judge does not even put his question as to right and wrong. Sir Henry Hawkins, known to the criminal classes as the hanging judge, went even further. In a case tried before him he relates that in order to avoid the sentence that would have followed an acquittal *on the ground of insanity*, which would have entailed perhaps lifelong imprisonment, he took upon himself to depart from the usual course, and ask the jury whether, without being insane in the ordinary sense, the woman might not have been at the time of committing the deed in so excited a state as not to know what she was doing. "I thus," he adds, "avoided the technical form of question sane or insane, and obtained a verdict of guilty, but that the woman at the time was not answerable for her conduct, together with a strong recommendation to mercy. This verdict, if not according to the strictest legal quibbling, was according to justice." He was obliged to pronounce sentence of death, but he first warned the prisoner to pay no attention to what he was about to say, and then mumbled over the words of the sentence of death so that she did not hear them.

Dr. Nicolson discusses with judicious fairness the many factors that have to be taken into account in forming an estimate of the mental state of an accused person. He shows the part played by mental enfeeblement arising from various causes—drunkenness, epilepsy, delusions of persecution, and so forth. He rejects "homicidal mania" and "homicidal impulse" as being phrases which are neither satisfactory nor explicit. In cases where phrases of this kind are employed, he says prolonged observation will generally reveal the existence of delusions or other symptoms of the insanity of which the murder was the outcome. Professed oblivion of the deed he looks upon with the gravest suspicion, and he advises practitioners to place no reliance on it, if it stands alone, as an indication of insanity. With regard to feigned madness, the possibility of imposture must always be reckoned with. Dr. Nicolson gives a useful hint on this subject when he says that the impostor not infrequently repeats the words of a question put to him that he may have time to think what to answer.

We have here only called attention to a few of the chief points in Dr. Nicolson's paper; the whole of it should be read, marked, and inwardly digested by all medical practitioners. It is the carefully considered deliverance of a man who has had an almost unrivalled experience of crime and lunacy, and who has not allowed his mind to be led away from the observation of fact to the framing of fanciful hypotheses. On this account it is deserving of the most attentive study.

THE HYGIENE OF POLITICIANS.

IN 1710 Bernardino Ramazzini, Professor of Physic in the University of Padua, wrote a monograph, entitled *De principum valetudine tuenda*, for the guidance of Raynald, Duke of Modena. He begins by laying down the sound principle that the health of a good ruler is the greatest of all blessings to his people. And, indeed, many of the saddest pages of history may be said to have been written with the blood of unfortunate victims of the savage temper engendered in the bodies of potentates by disease. Ramazzini solemnly says that a prince should allow himself to be reminded by his physicians of the changes of seasons so that his garments and general mode of life may be adapted to them. Temperance and sobriety at table should be enjoined. Princes should not be "fatigued with business" soon after dinner nor at all after supper. Manly exercises should be recommended. "The constitution of the prince should be carefully studied and well understood by his physician; and his diet, exercise, and evacuations ought to be regulated accordingly." It is also the duty of the physician to do his best to regulate the passions and emotions of his illustrious patient. These precepts are excellent in theory, but they might be difficult to carry out in practice. One can scarcely conjecture what would have been the fate of a doctor who should have warned Nero of the evil effect to his own constitution of indulgence in the lust of blood. It would have needed a bold man to preach self-restraint to Henry VIII; even Louis XIV, probably the most doctor-ridden of monarchs, would have dismissed a man who spoke plainly to him of the evils of over-eating. It is difficult to imagine a physician ordering Napoleon not to attend to business after supper! The hardest part of the duty of those who have charge of the health of a king undisciplined to self-restraint, or a masterful Minister, is to persuade them to remember that being mortal they must obey the doctor's orders.

In the May number of *L'Hygiène* the writer, who takes the name of Balzac's famous physician, "Horace Bianchon," discusses the hygiene of the great ones of the earth, by which he means heads of States, Ministers and so on. All such persons, he says, are very much to be pitied from the hygienic point of view. This is especially the case in France. A king may go out riding, hunting, and indulge in sport; the President of the United States may play at tennis or golf, and if he is a Roosevelt may indulge in a boxing match. In France the President is bound by a severer etiquette. He must keep himself acquainted with everything that is going on, and this necessitates a great deal of reading and frequent conversations with those who can instruct him. He must receive a number of visitors. He need not, however, like the American President, shake hands with five or six thousand people at the risk of getting cramp. However little he cares about literature, art, science, or philosophy, he has to keep himself posted in these subjects; in this his lot compares unfavourably with that of a king who like Edward VII was never seen with a book in his hand, and who did not know the name of one of the most graceful writers of his day. If the French President goes out it is in a carriage, to preside at a ceremony, attend a review, visit hospitals or barracks, and his longest walks are those which he takes twice a year when he opens the salon of the Société Nationale des Beaux Arts, or the Société des Artistes Français. On the other hand, he is not called upon to wear a score or so of different suits of clothes, including various uniforms, all more or less uncomfortable, in the course of the day. But he has to play the part of host at receptions where he has to remain standing almost motionless during long hours, and he has to attend innumerable banquets where he must at least make a show of eating and drinking. In this matter President Poincaré, we believe, subjects himself to an ordinance, self-denying indeed, but eminently prudent. He was once asked, "How do you manage to attend so many dinners, M. le Président?" The reply was, "By not eating them."

As for Ministers, their lot is still less happy. Their days are full of work, without counting the innumerable worries which cause a mental strain no sign of which must be allowed to appear. A vast amount of time must be spent in reading dispatches, dictating answers, receiving heads of departments, learning all that has happened, deciding quickly on matters of policy, preparing speeches for Parliament or the platform, attending meetings of the Cabinet, and receiving deputations. When to all this is added the direction of the tortuous and complicated manœuvres of political strife, it will be seen that in order to keep his place a Minister lives in a state of almost unbearable strain of body as well as mind. In this country men in high places are more fortunate. The burden of work is largely taken off the shoulders of the chief by the permanent officials who are the real Government. They draft everything, from budgets to bills for the making of a bridge over a small stream, or a road across a common. This is how our Ministers can spend week-ends playing golf and go on motor excursions. If the responsible Minister were not spoon-fed by the real workers under him he would soon collapse. The Minister is the mouthpiece of his department. "Words, words, words" are the essential part of the assets of a British Minister's equipment, and even these are supplied to him by his subordinates, while intelligent secretaries look up statistics, references, make extracts from former speeches of adversaries to show their inconsistency, and so forth. In fact, it is the special mark of genius of the administrative kind to be able to get other men to do the work. In regard to physical exercise, French statesmen, it is said, only get such as can be obtained in walking up and down a room dictating to a secretary. Nevertheless, they generally have a robust appetite. This, says "Horace Bianchon," would be surprising in men leading so sedentary a life if it were not known that the constant tension of the nervous system and great cerebral activity react by stimulating the working of all the glands of the organism, notably those of the stomach. Thiers, Macmahon, Jules Grévy lived long, and kept their faculties in the plenitude of their functions. Carnot died by an assassin's knife, but we still see M. Loubet and M. Fallières give proofs of a freshness of spirit. Only Casimir-Périer and Felix Faure died comparatively young of diseases in which autointoxication seems to have played a part. It is certain, however, that the effects of toxaemia engendered by gluttony and defective metabolism in rulers have often been seen in wanton misgovernment, wars, cruelty, and oppression. *Quidquid delirant reges plectuntur Achivi.* The mischief done by a gouty autocrat must be incalculable.

If the Presidents who have been mentioned have kept an alert body and a clear mind to an advanced age, this, according to "Horace Bianchon," is due to two things. In the first place, more than one of them, when, so to speak, off the stage, took great care of his health, and was watched over by a devoted wife, who regulated his diet, and allowed him to

drink only mineral water. Again, the high intellectual tension at which they have been obliged to live while in office is said to stimulate the production of the secretions, whose function it is to regulate metabolism. This must powerfully help in the improvement of nutrition and the destruction of toxins. It must be understood that we give this merely as the French writer's theory. His observations on the nutrition of intellectual workers seem to him to confirm the theory, but he admits that the effects of intense cerebral activity on nutrition have not yet been adequately studied. Apart from this theory, the fact, we think, must be taken into account that men who reach high place in the State are naturally of exceptional strength of constitution; hence they offer a greater resistance than the average man to the different forms of fatigue. The rise to eminence in political or professional life is largely a matter of survival. It is not always the fittest in a biological sense who survive, for invalids have often directed the fortunes of nations.

Passing to the rules of physical and intellectual hygiene which must be observed by the great, we should place at the head of them a sufficient amount of refreshing sleep. It will be noted that we lay stress not only on the amount but on the quality of the sweet oblivion that knits up the ravell'd sleeve of care. Rulers are saved from insomnia not only by the healthiness of their constitution but by the very number of things which engage their attention; this leaves no room for the tyranny of a fixed idea. Most great statesmen, even the evening before a great speech on which their career may depend, can throw off the thought of it and go to sleep as soon as their head touches the pillow. After his great speech introducing his first Home Rule Bill, Mr. Gladstone went home and slept quietly, leaving the debate to rage without his presence. On the other hand, there is the melancholy case of a Premier who used to spend night after night walking round the square in which his house was situated, seeking in vain for rest for his weary brain. Napoleon at his best could go to sleep whenever he wished. Towards the end of his career, during the campaign at Waterloo, however, drowsiness overpowered him, and the sight of him with his head on a small table asleep in front of his tent did much to dishearten his troops. The gift of sleep is, we are inclined to think, one of the most important factors of success, but it is extraordinary what a small amount may suffice to carry a man through a time of tension. According to the late Professor E. A. Parkes, Sir George A. Elliot (afterwards Lord Heathfield), who commanded in the great siege of Gibraltar, which lasted nearly four years, never slept more than four hours in twenty-four. For a healthy person with full consciousness of his responsibilities seven hours are generally sufficient to make up for the fatigue of the day.

As for food, no physico-chemical equivalent of intellectual work is yet known. "Horace Bianchon" says that the alimentary ration of sedentary men who do much brain work is the small one of 2,200 calories. A cutlet, two or three spoonfuls of rice or dry vegetables, two pieces of bread, a little butter, and dessert with sugar, are more than is necessary to make a perfectly reparative meal. Many intellectuals drink only water. On the other hand, most of them find in coffee a tonic and a valuable excitant of the cerebral circulation. Balzac, like Voltaire, found inspiration in coffee. The kidney and the liver should be washed out by drinking, when the stomach is empty, some glasses of any hypo-mineral water, such as Contrexéville, Vittel, or others of like kind. A little muscular exercise should be taken every day. The English, says the French writer, who are by instinct and education very good hygienists, know this well, and even when the political atmosphere is disturbed, the Premier, Lord Chancellor, and others who have to bear the burden of the State may be seen to play tennis, golf, and so forth. We beg to assure "Horace Bianchon," however, that the spectacle of a Prime Minister playing what he calls "footing" would probably draw a crowd from the uttermost ends of the kingdom. A French President or Minister, for some reason we do not profess to understand, is not allowed to seek relaxation in games. They may in the evening walk four or five kilometres on the pavement of the Champs Elysées in the company of one of their staff. Fencing is also recommended, with home gymnastics in moderation and under competent direction. Twenty minutes a day suffice for this. Then there is the hygiene of the mind. Politicians, with their multitudinous occupations, have to keep themselves in the highest intellectual training for the arena of the Chamber which makes concentration difficult. Almost all the eminent politicians whom "Horace Bianchon" has had the opportunity of observing at close quarters are men of method who have long been accustomed to regulate their day, to distribute their work, doing the same thing every day at the same hour. That is the secret of their strength. Methodical training of the mind as well as of the muscles is not neglected by them. He has known some who in certain moments of fatigue near to neurasthenic depression, when they found their will become weak, their clearness of mind clouded over, their memory idle, forced themselves to learn by heart and to recite pages of Bossuet, verses of Racine, and struggle to find names which escaped them, and repeat historical dates before their looking-glass. These suggested means of hygiene of the mind seem to us rather feeble. Most English statesmen who have written their names in the national history have been men of wide interests, who could thus vary the intellectual work of the forum with other diversions of the mind. Gladstone wrote on Homer and edited Butler's *Analogy*; Mr. Balfour can address a Church congress, a university, or a scientific conference with equal readiness of oratorical resource. Disraeli found refreshment in novel writing.

On the whole, the conclusion appears to be that there is no special code of health for the politician. His special enemies are nervous strain, insomnia, and gout; against these he can only use the ordinary weapons. His hygienic rule is that common to all who lead the strenuous life—to be sparing in diet, and especially in alcohol; to take what exercise he can get in the form he likes best, and to keep the field of his intellectual interests as wide as possible.

APPOINTMENT OF MEDICAL OFFICERS UNDER NATIONAL HEALTH INSURANCE COMMISSION (ENGLAND).

Numerous inquiries have been received by the Association from members resident in various parts of the country seeking advice as to the propriety or otherwise of their becoming candidates for the appointments recently advertised by the National Insurance Commissioners (England). In many of these instances we understand that practitioners applying to the office of the English Commissioners were informed that no information was available other than that contained in the advertisement itself. The matter came before the Insurance Act Committee at its meeting on September 4th, when instructions were given for an inquiry to be addressed to the Commissioners for

information as to the duties attaching to the appointments in question. A reply was received on September 11th, enclosing a copy of the statement of the duties, conditions of service, etc., which is now being furnished to all candidates inquiring as to these posts, as will be seen from the advertisement which appears in the advertisement columns of this issue. Briefly, the duties appear to be purely of an administrative character. It remains to be seen whether the commencing salary offered, even when the prospective pension is taken into consideration, will prove sufficient to attract the most suitable practitioners.

MEDICAL REFEREES AND LOCAL MEDICAL COMMITTEES.

THE constant complaints of excessive sickness claims under the Insurance Act has led us naturally to anticipate that some system of inspection would be devised, and it is evident that, without waiting for the report of the Departmental Committee now inquiring into any special circumstances which may cause such claims, many of the approved societies and Insurance Committees have determined to appoint medical referees for their own protection. This question being one of vital interest to the whole profession, we would direct special attention to the two resolutions (see SUPPLEMENT, p. 241) adopted by the Insurance Act Committee, which should be a useful guide to those concerned in such appointments. We hope that Local Medical Committees will refuse to recognize any such appointments, whether temporary or permanent, which are not in compliance with the terms and conditions laid down in the resolutions referred to.

BRANCHES AND DIVISIONS.

THE attention of members is drawn to the fact that, pursuant to a decision of the Council, dated July, 1913, proposals officially made for alteration of boundaries of Branches or Divisions, including proposals for discontinuance of existing or formation of new Branches or Divisions, will in future be published for the information of the members concerned. Under the by-laws such publication constitutes a notice to all the Branches, Divisions, and members affected. Written communications on the subject will, however, be sent, as heretofore, to the Honorary Secretaries of the Branches or Divisions concerned. A notice of the kind, affecting the South-Eastern, Metropolitan Counties, and Oxford and Reading Branches and Divisions of these Branches, will be found on p. 244 of this week's SUPPLEMENT.

SURGICAL REJUVENATION AND THE LAW.

IT was decided long ago that there was no property in a dead body, and for this reason in the old "resurrection" days the charge under which the bodysnatchers were convicted was stealing the grave clothes or destruction of the coffin. A living person may offer himself for experiment, though this, we imagine, is seldom done for gain. But as far as we know there is nothing to prevent an offer of this kind being made for a consideration. Of course, it must be clearly understood that the experiment shall involve no possibility of death, serious injury, or permanent disablement. A curious case lately came before the Lyons Court of Appeal. The following is a brief summary of the particulars as we find them set forth in the *Province Médicale* of July 5th. In 1908 a Lyons surgeon professed to be able by a new method of cosmetic surgery to restore the appearance of youth to those on whom time was writing his mark. His procedure was the removal of parts of the skin which had become wrinkled or baggy with age. In order to perfect his method, he thought it needful to find a subject on whom he could experiment at leisure. Such a person he found in a poor woman who, for £12, consented to undergo all the operations that might be considered necessary. A formal agreement to that effect was signed, and the doctor began his experiments forthwith, working on the eye, the neck and the breast, and leaving one side for control purposes. These operations were so painful that anaesthesia was required. When the experiments were completed the woman was taken to Paris and exhibited before the Congress of Surgery in October-November, 1908; afterwards she was shown before an assembly of doctors, artists, gentlemen at large, and ladies belonging to what Kipling calls the oldest profession, all of whom were seeking for the *eau de Jouvence*. The experiments, however, failed to carry conviction, and, notwithstanding skilful advertising, the doctor did not get a single patient. Having no longer need of his subject he summarily discharged her. She then proceeded against him for damages. The Tribunal nominated three experts, doctors and professors of the faculty. Their conclusions were that the woman had suffered no damage, material or moral, from these operations. On this report the Tribunal dismissed the case and condemned the plaintiff in costs. She then carried the case to the First Chamber of the Court of Appeal. Compensation was demanded for the material injury experienced and for the moral damage which she had suffered. For the doctor it was contended that the woman was trying to take advantage of a situation which she had accepted and from which she had suffered no harm. The court gave its decision in the following terms: "Whereas this agreement which had solely for its object practices of vivisection on an old and needy woman must be considered illegal and immoral, such an agreement could not be admitted to be compatible with human dignity, since by the hope of a trifling profit the appellant had determined to make traffic of her body and to make it serve for experiments useless if not dangerous to herself and which were undertaken only in view of the profit looked for by the experimenter." The agreement was therefore declared null and void. Dealing with the question of damages, the court went on to say that photographs, the accuracy of which was not disputed, showed that the operations done by the doctor on the woman's right breast, far from giving it the "globe-like form of youth," had had a pitiable result, and that the other operations had only added to the marks of age repulsive-looking scars and ridges. The court condemned the doctor to pay £20 damages, besides the costs of the action. The terms of the judgement strike us as remarkable. The court seems to have gone out of its way to place the transaction in an odious light by using the word "vivisection" and speaking of the immorality of the woman making traffic with her body, thus suggesting a kind of prostitution for experimental purposes. The studiously offensive language of the judgement, together with the sharp conflict of opinion as to a plain matter of fact such as the disfigurement said to have resulted from the operations, almost suggests animus in the higher court. At any rate, it seems strange that, in the face of the expert testimony, it should have held that material injury was done. We think it may safely be assumed that the "immorality" of the experiments consisted in their failure. The case has a practical interest, for if the present methods by which women seek to "express" themselves in dress, find, as seems likely, an ever-expanding field of development, there will be a larger demand for cosmetic surgery.

LISTER AS A STUDENT.

IN the Foundation Lecture delivered before the University College Union Society not long ago Sir Rickman Godlee gave an interesting account of Lister as a student. He was, said the orator, one whom his fellow-students recognized as a good man, probably without foreseeing that he would bring on the day of a new surgery. Lister saw the first operation performed in London under an anaesthetic,

the surgeon being Robert Liston. Sir Rickman Godlee says the operation was performed under chloroform. As a matter of fact ether was used; chloroform was not introduced to the notice of the profession by Simpson till November, 1847. Liston's historic operations—an amputation through the thigh and evulsion of great toe-nails—were done on December 22nd, 1846, under ether, which had been used for the first time in the Massachusetts General Hospital by John C. Warren on October 16th, 1846. Among Lister's fellow-students were William Flower, William Roberts, Henry Thompson (who was house-surgeon when Lister was dresser), Alfred Garrod, and George Buchanan. Lister was highly thought of by his teachers, and Sir Rickman Godlee quotes a letter from Dr. Carpenter almost apologizing for having put him last in the Physiology Honours List at the M.B. Carpenter explains that this was not in consequence of the independence of Lister's opinions, but because as answers to the questions his papers were so defective that if it had not been for the amount of original observation of which they bore evidence, his name would not have appeared in the honours list at all. The examiner goes on to say: "Whether this defect was the result of a want of systematic knowledge, or the consequence of the injudicious employment of your time—much having been spent by you in disquisitions which I did not require—I have no positive means of knowing." Carpenter feared the former must have been partly the case, as Lister showed ignorance on one question "which was answered correctly by every other gentleman." What a curious commentary on examinations as tests of intellectual power is this letter! Lister, as is well known, went on the advice of Sharpey to Edinburgh to see Syme's practice. The visit was intended to be a short one, but he never came back. Only on two occasions did he afterwards come in contact with his old school: once about 1865, when he was an unsuccessful candidate for the chair of surgery then vacant by the resignation of Richard Quain; and again in 1882, when he gave an address to the Medical Society on the application of a knowledge of hydrostatics and hydraulics to practical medicine. But throughout his life he continued to take a kindly interest in his Alma Mater. Sir Rickman Godlee proceeds to pass rapidly in review Lister's work which led to the transformation of surgery. Although it was the researches of Pasteur that gave Lister the inspiration which has been fraught with such incalculable benefits to mankind, there seems to have been no direct correspondence between them till 1874, when Lister was Professor of Clinical Surgery at Edinburgh. Lister sent to the French scientist his paper on the germ theory of putrefactive and other fermentative changes, and the natural history of *Torulae* and *Bacteria*. In acknowledging the communication, Pasteur wrote: "I heard tell of your antiseptic treatment by the same friend whom I mentioned, the chief surgeon at Val-de-Grâce, and Tyndall spoke of the success of your practice; but I confess, to my shame, that I was, and still am, very slightly informed about your labours, in spite of having a strong wish to become acquainted with them. Your paper, and the analysis of it which has been made for me, increases my impatience and regret. I am extremely surprised at the precision of your manipulations, at your perfect understanding of the experimental method, and it is an enigma to me how you can give yourself up to researches which demand so much care, time, and labour throughout their performance, whilst at the same time devoting yourself to the profession of chief surgeon to a large hospital. I do not think you could find an example of such a prodigy amongst us here. . . ." Sir Rickman Godlee gives a graphic description of the old hospital with its smells, its dusty pictures, its scanty arrangements for washing, and "the deft nurse or the clumsy dresser in his dirty old coat spreading a linseed poultice as large as a copy of the *Spectator*." We may say, in parenthesis, that some of the surgeons when on service wore coats that would have disgraced a dirty butcher. Many patients died of very slight injuries and operations, and very few of the surgical feats now done every day were even thought of then. If this was the state of things in University College Hospital, the hospitals of Glasgow and Munich and many other places on the Continent were far worse, being literally pest houses. Now what were known as hospital diseases—pyaemia, erysipelas, and hospital gangrene—formerly so common, are practically unknown, and lockjaw is seen only "once in a blue moon." Sir Rickman Godlee lays stress on the fact that although the elaborate appointments of a modern hospital are the outcome of Lister's work, they are not essential. Lister himself never worked in a palatial hospital, and equally good results can be achieved by any one who has thoroughly grasped the purport of his teaching and is careful to act in accordance with his principles, in old and crowded wards or in poor cottages.

THE HISTORICAL MEDICAL MUSEUM.

THE great interest aroused by the Historical Medical Museum during the recent meeting of the International Congress of Medicine has not abated, and we learn that the daily attendance at the Museum is still large. We recommend all doctors interested in the evolution of their art to visit it before September 30th, when it will be closed, to reopen, we believe, in the spring. Short accounts of the Museum appeared in the JOURNAL of May 10th, p. 1035, and June 28th, p. 1379. Since then considerable additions have been made to the collection; but it is Mr. Wellcome's wish to make it as complete as possible. Many families have relics such as MSS, early printed books, diplomas, prescription books, autograph letters, and other documents and objects associated with, or collected by, their ancestors who were engaged in medicine, surgery, pharmacy, and the allied sciences. Often, on the death of those who cherish such relics, the things are relegated to the garrets, or sent to auction rooms where they are scattered amongst strangers who buy them for a trifle as curios, and so the history and record of associations with the original inventor or user are lost for ever. We venture to suggest that it would be well if these things could be sent to take their place in the Historical Medical Museum, which has now been established in London on a permanent basis by Mr. Wellcome, where they would be preserved, and at the same time form a permanent tribute to the work and memory of those from whom they have been handed down. Many things which are insignificant and of little historical value in themselves if isolated in small private collections become important when brought into association with a series of others arranged chronologically; they often supply the missing links in the chain showing the evolution of such objects. An isolated historical object may be aptly compared to a single mosaic tessera which in itself alone signifies nothing, but when put in its place with others becomes part of a picture, and thus may help to complete a lasting record of a famous deed or a great event.

INFANT AND CHILD MORTALITY.

THE Second Report on Infant and Child Mortality by the Medical Officer of the Local Government Board[1] is a document of great importance. The bulk of the volume is devoted to a detailed account of the conditions prevailing in 241 urban areas. The plan adopted in scheduling these particulars is as follows: In the first place the population, birth-rate, death-rate at ages 1 to 5, and the infant death-rate are entered. If the area is divided into separate wards or boroughs the rate for each subdivision is also recorded. A diagram is then given showing how the

[1] H.M. Stationery Office. [Cd. 6909.] Price 2s.

death-rates at different ages (under 1 year), and with respect to different groups of diseases, compare with the average experience of all the 241 urban areas. Next follow a statement of the position of the area examined in the class of towns to which it belongs, an account of the sanitary conveniences and methods of disposal of excrement employed, and a description of the provisions adopted for the safeguarding of infant life. In the report itself, which extends to some 118 pages, Dr. Newsholme provides an analysis of the data collected, and formulates some provisional conclusions as to their import. Attention is rightly directed to the enormous differences in mortality between towns which in many respects closely resemble one another. A striking example is afforded by the case of Burnley and Nelson. The former has a population of some 106,000, the latter of about 40,000. They are both cotton-weaving towns situated within a few miles of each other. Yet the infant mortality-rate in the former was (in 1911) 210, in the latter 77 per 1,000 births. It appears that neither occupational differences, the employment of mothers, the degree of poverty, nor differences in the sanitary arrangements are sufficient to explain the wide divergence in respect of infant mortality. The birth-rate is higher in Burnley than in Nelson, but low in both towns. Certain differences are, however, apparent. Burnley is an old town, Nelson a modern one. Burnley is low-lying; Nelson situated on a steep slope, its lowest part being 350 and its highest over 1,100 feet above the sea level. The annual rainfall is also greater in the latter town. Dr. Newsholme remarks that the facts "illustrate the difficulty in assessing the relative importance in regard to infantile mortality, of poverty, industrial employment of mothers, sanitary circumstances, density of population, and climatic conditions." This weighty remark needs to be remembered in appraising the various conclusions suggested by the report, for the way in which deleterious conditions might operate in the production of excessive mortality are set out with such lucidity that unsophisticated readers might easily jump to conclusions which the author himself does not consider proven. The report is written generally in language of such studied moderation that the scientific reader will find little to which he can reasonably take exception. Dr. Newsholme's previous utterances on this subject have been criticized with so much acerbity by certain writers, that he would have been more than human if he had entirely resisted the temptation to retort. Nevertheless we are doubtful whether the remarks on p. 48 with reference to an alleged proof of the selective effect of a high infant mortality are entirely well judged. Sufficient is said to provoke an acrimonious reply, but not enough to carry conviction to a statistically trained reader. The point is not whether life tables constructed by different methods are completely comparable, but whether the differences in method are sufficient to render them incomparable for the purposes in view. That the life tables give results different from those yielded by average rates of infant mortality does necessarily indicate that reasoning based on the former data is incorrect. Dr. Newsholme reiterates his conclusion that the relationship between large families and high infant mortality is in the main indirect, and seems to hold that it may be referred to the fact that large families are most common amongst the poorest classes who live under conditions unfavourable to child life. This opinion was not shared by so experienced a statistician as Westergaard,[1] and is not borne out by the valuable Bavarian data collected by Groth and Hahn and analysed by Greenwood and Brown.[2] It is, however, obvious that upon these and many kindred problems differences of opinion must arise, and the severest critic cannot deny that Dr. Newsholme adduces weighty reasons in support of most of the statements he makes. This report reflects much credit both on the writer and his assistants, and almost every page bears ample witness to the zeal and efficiency which characterize our public health administration.

[1] *Die Lehre von der Mortalität und Morbidität.* Jena, 1901, p. 368.
[2] *Journal of Hygiene*, xii, 1912, p. 5.

THE SCHOOL MEDICAL SERVICE.

THE Board of Education has issued new regulations laying down the conditions under which during the year ending March 31st, 1914, it will make grants in respect of the medical inspection and medical treatment of children attending public elementary schools and the medical treatment and care of children attending certain special schools in England and Wales. In settling the rate of grant the Board will have regard to the scope, care, and efficient working of the education authority's provision and arrangements for medical inspection, for following up cases, for securing medical treatment of cases requiring it, for co-ordinating the work of the school medical service with the work of the public health service in the area, and for rendering the school medical service an integral part of the system of elementary education in the area. In a circular letter to local education authorities the Board lays emphasis on the need of an accurate and comprehensive examination of the children submitted for routine medical inspection and of a careful and effective system of recording the results of the examination. It also calls the attention of education authorities to the need under the new conditions as to grant for an accurate, clear, and full statement of the work of the school medical service in each area. The circular also states that the Board considers that the time has come when the work of medical inspection should be consolidated by making provision for the routine inspection of an intermediate age-group in all areas, and gives notice that next year medical inspection of all children between 8 and 9 years of age will be required. The regulations as to final inspection are in future to apply to children between 12 and 13 years of age; this instruction replaces the system hitherto in force which required inspection of all children "expected to leave school in the year." One of the paragraphs in the circular letter deals with the salaries paid to the staff of the school medical service. The scale, it is said, is in a number of areas satisfactory, but in many others the salaries are not adequate, "having regard to the responsible and onerous character of the increasing duties to be performed, and do not offer sufficient inducement to attract and retain the services of capable and experienced officers." The method of paying on the basis of the number of children inspected which obtains in certain areas is condemned as unsuitable, and the Board expresses the opinion that the question of salaries must affect the efficiency in the school medical service, and should be a matter of serious concern to the authorities as well as to the Board. It is satisfactory to find the Board taking a definite line in this matter, and indicating its opinion that adequate remuneration of school medical officers is an essential part of an efficient school medical service, and, as the rate of grant is to depend on the efficiency of the service, this collocation of ideas must be taken to be a delicate way of conveying a hint to niggardly authorities of the possible financial consequences of false economy in this direction.

SPIRITUALISTIC DIAGNOSIS.

WE learn from the *Revue Suisse de Médecine* of May 17th that, giving effect to a resolution passed by the Spiritualist Congress held at Charleroi in 1911, the Belgian Spiritualistic Federation some time ago sent out a circular letter to all doctors in Belgium which, among other things, contained the following statement: "Certain persons are gifted with a kind of sensibility of an ill-defined nature which enables them to describe the state

of the internal organs of the patients presented to them with a precision as great as if their sight penetrated directly into the interior of the cavities examined. Other individuals seem to possess extraordinary therapeutic powers conveyed by emanations from their fingers. Those who may be disposed to open clinics specially intended for the utilization of the therapeutic procedures due to spiritualism may also get into communication with the persons indicated above through the medium of whom the support of the Belgian Spiritualistic Federation will be given them within limits indicated by circumstances." Most doctors at once threw the circular into the wastepaper basket, but a professor who felt some curiosity on the subject asked that two of the best mediums should be sent to him. This was done. Experiments were then made, in the course of which there were presented to the mediums dead animals, animals on whom *post-mortem* examinations had been carried out, and even opened animals with lesions distinctly visible. Then living animals, artificially infected with various diseases, were submitted to them and afterwards examined *post mortem*. Lastly, human subjects, both healthy and diseased, were offered for their inspection. The statements by the mediums did not agree. They were vague and mostly erroneous; indeed, it was only exceptionally that they corresponded with the reality as observed. When the same animal or the same person was presented a second time without notice being given to the mediums, their statements differed from those they had previously made. The professor therefore dismissed the mediums, having satisfied himself that they possessed none of the gifts attributed to them. These experiments, which recall the famous exposure by Thomas Wakley of the pretensions of the mediums on whom Elliotson too easily pinned his faith, will seem absolutely conclusive to persons capable of right reasoning. But no amount of exposure of mediums will open the eyes of those who believe in them. The wish to believe makes them see signs and wonders where to ordinary persons there is nothing but fraud and imposture.

ACCIDENTS DUE TO DEFECTIVE SIGHT.

WHEN discussing the cause of accidents which have occurred on sea and land which may or may not have been caused by the defective form and colour vision of those in charge of ships or trains, there is often some difficulty in establishing the facts. There are various reasons for this. One is the difficulty of getting an impartial and adequate account of the accidents so that the whole of the details may be known. This may be overcome in some instances by laborious research; but there is another factor, and that is the impossibility in most cases of being able to ascertain what was the condition of the sight of the look-out or engine driver who happened to be in charge at the time. Mr. Nettleship has rendered a very real service in writing a small pamphlet, consisting only of 54 pages, in which he gives details of, and references to, many of the cases in which it is fair to assume that defective vision had something to do with causing the accidents. He traces the history of the recognition of the possibility of accidents being caused by defective sight; as the first case of which notice was taken occurred as late as 1873, it is obvious that not much attention had been paid to the subject before this. It was only a little more than a century ago that colour-blindness was recognized at all, and the first person to suggest that it might be a cause of accidents was Dr. George Wilson of Edinburgh, who drew attention to it rather less than sixty years ago. Owing to indifference and failure to recognize its importance, so little was thought of it as a cause of collisions, etc., that in official investigations the question of defective sight in the men on duty was scarcely ever raised, and Mr. Nettleship says that "naturally, therefore, no accidents are discovered to have had visual defects for their cause. Continuing to reason in a circle, the conclusion is that defects of sight do not cause accidents." He points out how ludicrous it is that, although precautions are taken to exclude men who have defective sight from entering the sea or railroad service, a precaution which is an admission that such defects are dangerous, yet when an accident happens no trouble is taken to find out whether the man responsible for it actually had efficient sight or not; the question is never even considered. "Over and over again, both at home and abroad, attention has been forcibly drawn to this extraordinary state of things," but still nothing is done. "It ought to be obligatory for those men, and any others who give evidence as to signals, to have their sight tested by expert examiners after every maritime or railroad accident in which the nature of the signals that are in question has to be inquired into." Every one interested in the subject should read the introduction to the pamphlet under consideration. Mr. Nettleship then gives a detailed description of many accidents, both at sea and on land, in which there is either proof, or a very strong probability, that the accident was caused by defective sight. There are not many cases on record, for the reason that, as stated above, no one is ever examined after an accident, but those that are given must surely convince every one except a Board of Trade official. Take such a case as this: A captain of a large Atlantic steamer suddenly heard the officer of the watch give the order "Hard-a-port." He rushed on the bridge to find out what was the matter, and in reply to his inquiry, the officer said, "Red light ahead, sir," but as the captain at once saw it was a green light, he ordered the helm to be put "Hard-a-starboard," and by this means only just averted a collision. Cases like this could be multplied indefinitely, if only it were made a practice to examine the sight in all cases of accident. Railway cases are just as convincing, and many of them are mentioned by Mr. Nettleship.[1] He recalls one case in which an engine driver thought a signal was partly red and partly green, and ran his train past it and caused an accident; that he thoroughly agrees with what we said in the BRITISH MEDICAL JOURNAL of April 4th, 1908, when commenting on this case, that a man suffering from tobacco amblyopia would be likely to make just such mistakes about his signals as this driver actually did make. It is to be hoped that Mr. Nettleship's influence will be used and will perhaps be powerful enough to make the Board of Trade recognize the immense importance of the subject of eyesight in those responsible for ships and trains. Then perhaps the Board will cease to endeavour to cover itself with the cloak of official ignorance, and declare, as it does at present, that it is unaware of any accidents due to defective eyesight having taken place. Mr. Nettleship has done a real service in publishing this small book and in again drawing attention to this lamentable state of affairs.

PLATO AND FREUD.

IF further proof were needed of the truth of the old saying that "There is nothing new under the sun," the contribution of Dr. J. W. Courtney in the *Boston Medical and Surgical Journal*, vol. clxviii, No. 18, on this subject, assuredly provides it. The Greek philosophers appear to have found in nervous phenomena a fascinating and fruitful field for speculation. According to the author, this "pernicious" habit, indulged in by every philosophically-inclined writer, from Plato onwards, is more responsible for the unsatisfactory nature of our understanding of the pathology and treatment of these disorders than any other factor. Dealing with the causation of hysteria, he quotes Plato—from the French translation of Cousin—

[1] *On Cases of Accident to Shipping and on Railways due to Defects of Sight.* By E. Nettleship, F.R.C.S., F.R.S. London: Adlard and Son. 1913. (Demy 8vo, pp. 58. 2s.)

as having expressed himself as follows: "The womb is an animal which desires ardently to engender children. When it remains sterile for a long time after puberty, it endures this state with difficulty; it grows angry, rushes here and there through the body, obstructing the air passages, hindering the respiration, throwing the body into extreme danger and occasioning divers maladies, until desire and love bringing together the man and the woman create a fruit and cull it as from a tree." Courtney wishes particularly to call attention to that part of the theory which deals with the mental and emotional attributes ascribed by Plato to the uterus, these attributes consisting, as indicated, of intense strivings and desires on the one hand, followed by anger and other violent emotions if they are not satisfied. The author's view is that the transition from the Platonian theory to Freudism is simple. Freud, he states, simply shifts the above-mentioned attributes to their real sphere—the mind. According to the terms of the Freudian pathology, the mind of the victim of hysteria is the seat of a violent conflict between two groups of ideas or mental processes which cannot be brought into harmony with one another. In a closely reasoned analysis the author traverses in some detail Freud's views, noting especially the fact that the theory in question locates the patient's trouble entirely within the realm of ideation and emotion, dealing with the actions and emotions of the psychoneurotic individual as a pure abstraction, without any regard whatever for their organic source. It is now generally admitted that the psychoneurotic comes into the world with a soil well prepared by heredity—immediate or remote—for the development of his unhappy malady.

THE EFFECTS OF ASPHYXIATING BOMBS.

IT will be remembered that recently the French police have had more than one man killed while attempting the arrest of dangerous criminals, and in consequence M. Kling, Director of the Paris Municipal Laboratory, has prepared a so-called "asphyxiating bomb"—a little projectile which rapidly diffuses around the person aimed at a product which renders the atmosphere irrespirable in consequence of the irritation produced by this vapour upon the mucous surfaces. This bomb was employed recently in an attempt to rearrest a dangerous lunatic who had escaped from the asylum of St. Anne, and after having frightened away all his domestics by firing at them with a revolver, had barricaded himself in his flat. The Commissary of Police entered the flat accompanied by the *concierge* and by three agents of police provided with "chromated shields" and asphyxiating pistols. After having removed the furniture with which the entrance hall was blocked, they found the lunatic solidly barricaded in a small room which looked upon the courtyard. Looking through a fanlight from the bathroom, they could see him standing by armed with a revolver. Attempts to parley obtained no response whatever, so they broke the glass, to which the lunatic responded by revolver shots. The asphyxiating pistols were then discharged into the room through the broken glass, the door was burst open, and the lunatic seized just as he appeared to be about to throw himself out of the window. The question of medical interest is what effect was produced by the bomb, and was it in any way injurious to the subject of this operation? From an account given by Dr. Briand to the Parisian Clinical Society of Mental Medicine,[1] it appears that the patient, after his return to the asylum, gave an account of his experience. He said that when the cartridge reached him he thought that chloroform had been thrown at him; he felt immediately violent pricking in the eyes, which obliged him to keep them shut, and he rubbed them in a vain attempt to stop an intense flow of tears which prevented his raising his eyelids. At the same time he felt as if he were going to be suffocated, and there was an abundant running from the nose; the whole effect was, he said, instantaneous. He also thought that he had a vague desire to sleep, but, in any case, rubbing his eyes with one hand and holding his nose with the other, he rushed to the window in order to breathe and not for the purpose of throwing himself out as was suspected. There was no loss of consciousness, and he had a perfectly accurate recollection of all the details of his arrest. After his admission he was carefully examined, but the mucous membrane of the nose and eyes showed nothing abnormal in colour or secretion. Examination of the lungs showed no bronchitis. It is somewhat astonishing, says Dr. Briand, that such an irritating gas can produce instantaneously intense lacrymation, nasal discharge, and a sense of suffocation, without leaving the slightest apparent lesion of the ocular or respiratory mucous membrane. Nor had this means of arrest any unfavourable effect upon the patient's mental condition; it was in fact to him merely another form of the persecution of which he believed himself to be a victim. It is probable that but for the use of this means the patient would not have been arrested without injury to himself, and perhaps, too, without more or less dangerous revolver wounds received by the persons charged with this duty. It would therefore seem that these bombs are a useful and humane means of facilitating the arrest of dangerous lunatics or criminals.

[1] *Semaine médical*, 1913, No. 25, p. xcviii.

SIR RICKMAN GODLEE has accepted an invitation, conveyed to him by Dr. Franklin H. Martin (Chicago), Dr. J. B. Murphy (Chicago), Dr. G. E. Brewer (New York), Dr. George W. Crile (Cleveland), and Dr. William J. Mayo (Rochester, Minnesota), to confer the Fellowships of the American College of Surgeons—the foundation of which was mentioned in the JOURNAL of May 31st, p. 1163—at the first convocation of the institution, which is to be held at Chicago on November 13th. On that occasion 1,400 prominent surgeons of the United States and Canada will, it is stated, be created Fellows.

AT the last annual meeting of the Royal Society for the Prevention of Cruelty to Animals the re-election of Lord Cheylesmore as a member of the council was rejected by a majority of five votes, on the ground that he is a vice-president of the Research Defence Society. Considerable dissatisfaction on the subject having been expressed by supporters of the society, the Council decided to take a poll of the members. As a result 2,641 votes were recorded in favour of and 866 against Lord Cheylesmore's re-election—a majority in favour of 1,775.

WE are asked to state that Cardinal Bourne will hold a reception at St. Andrew's Hospital, Dollis Hill, on September 26th, at 2.30 p.m. The Lord Mayor of London, accompanied by the Lady Mayoress and the Sheriffs, will attend in state. St. Andrew's Hospital has recently been opened for paying patients of limited means who, while unsuitable for admission to charitable institutions, are unable to meet the charges necessary to secure adequate medical or surgical attendance in a private nursing home. The institution has been built and furnished to meet all modern requirements, and has also the advantage of its own spacious grounds, and country surroundings, which provide ideal conditions for convalescent patients. A description of the hospital appeared in the BRITISH MEDICAL JOURNAL of November 30th, 1912, p. 1574.

Scotland.

[FROM OUR SPECIAL CORRESPONDENTS.]

INSURED PERSONS AT THE EDINBURGH ROYAL INFIRMARY.

Now and again one is reminded that there are still unsettled matters in connexion with the working of the Insurance Act and the hospitals. Thus, at a meeting of the managers of the Edinburgh Royal Infirmary on September 1st it was reported that during the month from July 15th to August 14th the total number of persons admitted to the wards for treatment was 994, and that of these 426, or 42 per cent., were insured persons; whilst of 2,986 new out-patients in the same period 985, or almost 33 per cent., were insured persons. These figures drew from one of the managers the inquiry whether any application for a contribution on account of these persons had been made, and the clerk answered that the superintendent would submit a report on the subject in October before any application was made.

POST-GRADUATE RECEPTION IN EDINBURGH.

On the afternoon of Monday, September 1st, the Executive Committee of the Edinburgh Post-Graduate Courses in Medicine gave a reception in the Students' University Union to the graduates (109 in number) who are attending the September course, or who had been in attendance during August, and to the lecturers, between sixty and seventy in number, who are carrying on the teaching. The guests were received by Professor Harvey Littlejohn, Chairman of the Executive Committee and Dean of the Medical Faculty in the university, by Dr. J. W. Ballantyne, the vice-chairman, and Dr. J. D. Comrie, the honorary secretary, and an agreeable hour was spent by all. Professor Littlejohn, in welcoming the graduates, said it had become an annual event that the teachers should have an opportunity of meeting those who honoured them by coming to Edinburgh for these summer courses. The committee of the union had been kind enough to throw open their rooms for the benefit of the visitors during the entire period of the courses, and he wished to acknowledge their kindness. After some remarks, in which criticism of the arrangements and methods of teaching was invited, he concluded by saying they were going to have a very strenuous month, and he could only hope they would find it satisfactory, and would carry away pleasing recollections of the post-graduate classes this year in Edinburgh. For some time before September 1st all the places in the surgical course, and in the ear, nose, and throat course, had been taken up, as well as those in most of the special classes (vaccine therapy, ophthalmoscopy, *x* rays, etc.). The general medical course and the course in genito-urinary surgery have also attracted a large number of graduates. The teaching begins at 9 a.m., goes on all day till 7 p.m., and there is on three days out of the week a class on ophthalmoscopy at 8 p.m. Certainly the courses do not err on the score of unoccupied intervals of time.

The special five o'clock lectures are again an interesting part of the September programme. These are addresses given generally by the more senior members of the teaching staff on subjects which they have made specially their own. This year Dr. Byrom Bramwell is to lecture upon salvarsan in the treatment of pernicious anaemia, Professor Harvey Littlejohn on medico-legal cases in general practice, Sir Halliday Croom on practical methods of dealing with placenta praevia, Mr. Stiles on the treatment of tuberculous cervical glands, Dr. Harry Rainy on blood pressure, and Professor Alexis Thomson on affections of the spinal column with special reference to *x* ray diagnosis (with lantern slides). Dr. Berry Hart is to make some remarks on eugenics in medicine and Dr. Woods Hutchinson is to speak of the control of syphilis; and finally Dr. Cunyngham Brown will deal with the modern treatment of inebriety and the law relating to it, Dr. John Keay with mental disorders, and Dr. Allan Jamieson with eczema. The five o'clock lectures, given on Mondays, Wednesdays, and Fridays, are open not only to the graduates attending the courses but also to all medical practitioners. They have drawn large numbers in the past, and the present list seems to possess also real attractive force.

THE ROXBURGHSHIRE NURSING ASSOCIATION.

On September 5th H.R.H. Princess Henry of Battenburg opened a bazaar in aid of the Central Fund of the Roxburghshire Nursing Association; the bazaar was held in the grounds of Springwood, Kelso, by permission of Sir George R. Douglas, Bart., who presided at the opening and explained the work of the association, which was to bring trained nurses within the reach of the less well-to-do who were resident in the rural districts of the county, and had been founded in commemoration of the Diamond Jubilee of the late Queen Victoria. The ladies of the District Red Cross Society formed a guard of honour, and Dr. M'Kellar (Kelso), Commandant, was in charge. There was a large and distinguished company, including the Countess of Minto, Lord and Lady Binning, Sir Richard J. Waldie-Griffith, Bart., and Lady Waldie-Griffith, Captain and the Lady Nina Balfour, Lady Stratheden, Lady Elizabeth Scott, and many others.

Ireland.

[FROM OUR SPECIAL CORRESPONDENTS.]

RECEPTION BY PRESIDENT OF ULSTER BRANCH.

ON September 6th Dr. and Mrs. Campbell received at an "At Home" the members of the Branch and friends at their residence, Castle Upton, Templepatrick, co. Antrim. The weather was all that could be desired, the grounds were beautiful, and the large trees were thick with foliage, of which only a few had begun to show an autumnal turning.

Dr. Campbell had very thoughtfully prepared a short history of the castle, and of the old Presbyterian meeting house that stands in the demesne, where his father and grandfather had been officiating ministers from 1796 to to 1894. There was an extensive and delightful musical programme, and lavish refreshments were served in the large dining room. Both ladies and members enjoyed to the full the kind hospitality of the hosts, enhanced by the ideal afternoon and the natural beauty of the place.

MEMORIAL TO THE LATE DR. RUTHERFORD.

On August 30th, at Ballinasloe, in the presence of a large gathering of the townspeople, Lord Clancarty unveiled a memorial (a public drinking fountain) which has been erected by public subscription to the memory of the late Dr. William Rutherford, who for thirty-six years practised his profession in the town. Lord Clancarty was accompanied on the platform by Dr. Mills, Honorary Secretary of the Connaught Branch.

Dr. Mills said he had received numerous letters of apology from parties regretting their absence, and mentioned the names of Archdeacon Daly, Mr. Lancaster, and Messrs. Chute and Fowler and Father Pelly. Lord Clancarty said William Rutherford was born at Cookstown, in the county Tyrone, in the year 1846. He entered the profession in 1865 as a pupil under the late Dr. Charles, of Cookstown, and afterwards entered the old Queen's University of Ireland, and he secured many prizes and scholarships in Queen's Colleges of Galway and Belfast. In 1872, having gone through his course at college, he came to practise in Ballinasloe. For three years he remained in Ballinasloe, when he decided to leave; but during those three years he had endeared himself to the people of this district, both by his medical skill and his own personality, and the result was that a deputation went to him; they presented to him an address, also a gold watch and chain and a drawing room cabinet, as a mark of their esteem. Dr. Rutherford could not but feel touched by the persuasions of the people of Ballinasloe, and, being begged to remain, he consented, and for a further period of thirty-six years he practised and resided in Ballinasloe till he passed away. He was a friend of every one and had no enemies. The inscription on the monument is as follows: "Erected by the people of Ballinasloe and neighbourhood in memory of W. Rutherford, M.D., F.R.C.P.E. He laboured unselfishly in their midst for 40 years. A sincere friend, an eminent physician, a public-spirited and upright citizen. Obiit July 22nd, 1911."

Dr. Mills, in proposing a vote of thanks to Lord Clancarty,

gave a sketch of Dr. Rutherford's career. He was one of the first and strongest advocates of procuring for the town the excellent waterworks they now enjoyed. Therefore this fountain was fittingly erected to commemorate his connexion with it. There were many thousands who could bear witness to the industry, care, and perseverance with which he investigated every case. Whosoever sought his services received unstintedly and unreservedly of his best. The fee or reward did not enter into his conception of the case. His sole idea was to apply such abilities as God had given him in no ungrudging measure to the alleviation of the sufferings of those seeking his aid.

J. WALTON BROWNE, ESQ., M.D., D.L.

It was with exceptional pleasure that Mr. J. Walton Browne's innumerable friends heard that he had been made Deputy-Lieutenant of the County of the City of Belfast. Mr. Walton Browne is the senior surgeon of Ulster; he was surgeon to the Royal Victoria Hospital for thirty-seven years, and, since the death of the late Professor Cuming, chairman of the medical staff till his retirement two years ago, when he was appointed consulting surgeon. Both the profession and the public join in heartiest congratulations and best wishes to Mr. and Mrs. Walton Browne.

FALL OF DUBLIN TENEMENT HOUSES.

Public attention has been called in a startling manner to the question of the tenement house system in Dublin by the sudden collapse of two houses in the slum area of Dublin recently, causing the death of seven victims, and more or less severe injuries to several others. It would appear from the evidence given at the inquest that the only warning that the inhabitants got of the impending catastrophe was the fall of a mantelpiece in one of the houses, and that a few minutes afterwards both houses fell in a mass of ruins into the streets, burying among the débris a large number of the poor people who lived in them. Owing to the energetic action of the police and the fire brigade and voluntary civilian helpers, many of those who were buried were got out in safety; most of those who were killed were crushed and injured in a shocking manner. As the two houses were inhabited by eleven families of nearly fifty persons, it is fortunate that there were not more killed; this must be attributed to the fact that the accident happened about 9 o'clock at night, before most of the inmates had retired to bed. If it had happened a few hours later, the result would have been an even more appalling loss of life. The Corporation Inspector of Dangerous Buildings stated at the inquest that he had examined these two houses a few months ago, and had ordered certain repairs, and that these had been satisfactorily completed on August 12th last. No fewer than 20,000 families—nearly a third part of the population of the city—live in single room tenements. In the last few years there has been a considerable amount of talk and agitation about the tenement question in Dublin, and a certain amount has been already done towards providing the working-class poor with decent homes. These very two houses are included in an area which has been condemned by the Corporation, and plans have already been approved of for the erection of model workmen's dwellings, involving a cost of nearly £45,000. Last March the Local Government Board made an order confirming the scheme, and it is understood that the usual steps are being taken to acquire the site, and that the valuation and inquiries as to title, etc., are at present proceeding; but in the ordinary course of events, the pulling down of the houses and rebuilding would not be commenced for a couple of years at least. It is to be hoped that the effect of this disaster will be to hasten the action of the Corporation in acquiring the site and providing the new dwellings.

DECLINE IN VACCINATION.

From the reports of various boards of guardians throughout Ireland it has been shown from time to time in these columns that there is a serious falling off in the number of children in Ireland who are vaccinated. A letter was published in the Dublin press last week from Sir Charles Cameron, Medical Superintendent Officer of Health for Dublin, calling attention to this decline in vaccination and stating that there is now plenty of inflammatory material to catch fire from, and possibly cause an epidemic of smallpox, should a case of this disease occur in Dublin. In Ireland the law does not recognize the so-called "conscientious objector," and local authorities have full power of vaccination. The decline, therefore, in the number of vaccinated children can only mean that the local authorities are not enforcing their powers, and it is to be hoped that some notice will be taken of the grave warning issued by such an authority.

DONEGAL MEDICAL OFFICER EXONERATED.

At the last meeting of the Stranorlar Board of Guardians a letter was read from the Local Government Board informing the guardians that having received the report of their medical inspector, Dr. McCarthy, relating to the inquiry on oath held by him into the charges of neglect of duty preferred against Dr. Johnston, Medical Officer of Stranorlar Dispensary District, the Board, on full consideration of the evidence, was of opinion that Dr. Johnston acted strictly in accordance with his duty, and that he was completely exonerated from the charge of neglect.

CROOKSLING SANATORIUM.

At a recent meeting the Dublin County Council considered a letter from the Lord Mayor of Dublin in reference to the joint control of the Crooksling Sanatorium, setting forth the conditions suggested by the Corporation as a basis of agreement. The letter stated that these were the least possible terms that the Corporation could agree to, and that they were prepared to take over entire control of the sanatorium if the Council did not agree to them. The Council considered that the terms were absolutely ridiculous, and stated that if they got the money that was due they could go on and complete the building already commenced. It was decided to ask the Local Government Board to hold an inquiry and adjust matters between the two bodies, as it was clear that no agreement could be come to by them.

SLIGO TUBERCULOSIS DISPENSARY.

At the last quarterly meeting of the Sligo County Council there were three applicants for the post of matron at the proposed County Sligo Tuberculosis Dispensary at a salary of £100 a year, with rations and apartments. Miss Byrne, Ballina, was elected by the chairman's casting vote.

ELECTION OF WORKHOUSE MEDICAL OFFICER.

At last week's meeting of the Balrothery Guardians the election of a medical officer for the workhouse at a salary of £120 a year, in succession to Dr. Hayes, who has been promoted to the Lusk Dispensary district, took place. Dr. May, of Drogheda, was unanimously elected to the post at the full salary.

Special Correspondence.

PARIS.

Tuberculosis in Paris.—Three Years' Military Service Law.—New Operation for Talipes.

THE question of obligatory notification of phthisis in France has created a profound interest not only in the medical profession, but also amongst the laity, and the pros and cons are coming up for frequent discussion. Those in favour of the measure have certainly a strong case when they quote the statistics of Paris and of Berlin. In Paris in 1875 the mortality from phthisis was 41 per 10,000; in 1910, 35.30 per 10,000, or a decrease of 14 per cent. In Berlin the corresponding figures are 34 per 10,000 in 1875 and 18.75 in 1910, or a decrease of 45 per cent. against 14 per cent. in Paris. Again, during a shorter and more recent period, the German decrease is also marked. In France during 1910 the mortality was 22.2 per 10,000, and in 1911, 21.6, or a decrease of 2.7 per cent. In Germany the corresponding figures are 17.3 and 15.1, or a decrease of 12.4 per cent. Great Britain shows a similar reduction in mortality, and the French, as a whole, now consider the time has come when like measures should be adopted.

The new military law making it necessary for all able-bodied Frenchmen to serve three years instead of two in

the army, contains a clause by which conscription begins at 20 years of age instead of 21. Major Boigey, speaking at a recent meeting of the Society of Military Medicine, suggested the following conclusions regarding this new clause: (1) About the age of 25 a man is at the height of his physical vigour and fitness. (2) A man of 20 is worth less than a man of 25. (3) Men of 20 to 21 have a somewhat equivalent and equal physique. (4) Forty to fifty per cent. of the German army is composed of men of 20 years of age. (5) In the French army 40 to 45 per cent. of examined applicants pass, whereas in Germany only 27 per cent. are admitted. (6) The medical examination in France must be more strict if younger men (20) are admitted for service.

Dr. Lucas-Championnière reported recently to the Academy of Science the successful results which he had obtained by the operation of ablation of the tarsus for talipes. Some 42 cases have undergone this operation since 1889, and appeared to be cured after removal of all the bones of the tarsus except the posterior portion of the os calcis. By removing the tarsus the foot becomes so pliable that without any section of the tendons, muscles, or nerves, the foot may be moulded into its natural shape, and without any orthopaedic instruments the patient has a useful foot, as the cartilage which is left ossifies and new bone grows. The results are highly satisfactory, and Dr. Lucas-Championnière recommends the operation highly.

Correspondence.

THE CAUSE OF RHEUMATOID ARTHRITIS.

SIR,—So many divergent views were expressed at the London conference as to the cause of rheumatoid arthritis that one hesitates to make confusion worse confounded by advancing yet another theory. It appears to be really due to deficient secretion of the sweat glands.

When acting as medical officer to one of the large metropolitan workhouse infirmaries I was much impressed by the fact that patients crippled by rheumatoid arthritis always showed dry skins and were difficult to get to perspire; on the other hand, rachitic children were always bathed in excessive perspiration. Those whose bones were being enlarged and thickened by too much calcareous deposit had deficient perspiration, and those whose bones were being thinned and weakened by the removal of calcareous salts had excessive perspiration.

Copious sweating appears to favour removal of lime salts from the bones, and deficient sweating leads to the accumulation of these salts. It is, of course, common knowledge that any sudden chill which stops perspiration in rheumatic people is followed by an aggravation of the painful symptoms. The phenomenon that excessive sweating induces thinning of the bones, and deficient sweating induces thickening of the bones and joints with calcareous matter, is somewhat analogous to goitre and myxoedema depending on excessive and deficient action of the thyroid gland respectively. The most efficient treatment of this form of arthritis, as carried out at the most up-to-date establishments, is entirely in harmony with this theory of causation.

Active measures are taken to stimulate the sweat glands by hot-air baths and hot massage douches, and when these measures are accompanied by warm and sheltered climatic conditions such as are found at Aix-les-Bains the best results are obtained. To maintain this improvement it is essential that the skin be kept active, and this is best accomplished by daily doses of sodium bicarbonate. The sweat glands, beside being a water-cooling system, are without doubt very important excretory glands, and any interference with their excretory function is exceedingly dangerous to health and life. This is proved by the classic incident at the enthronement of Pope Leo X when a child was covered with gum and gold leaf to represent an angel, and died in a few hours. In a book, entitled *La Rome des Borgias*, recently published in Paris, it is stated that Cæsar Borgia had three women covered with gilded varnish and exposed as a spectacle, and all three died in a few hours.

It is very difficult to obtain a minute analysis of the sweat secretion in any modern textbook, and there appears to be need of research in this matter.—I am, etc.,

Sunderland, Sept. 1st. THOS. A. WATSON.

SUBCUTANEOUS INJECTIONS OF ADRENALIN.

SIR,—Dr. F. W. Bennett, in the JOURNAL of August 30th, reports a non-fatal case of syncope arising from the injection of adrenalin into the nasal mucous membrane of a patient lightly anaesthetized with chloroform, and he speculates upon the strength of the solution of adrenalin which may be considered safe under such circumstances.

There would appear to have arisen some confusion in regard to the effect of varying the solution strength of the injection; for although this will control the local (that is, ischaemic) reaction, the general and cardiac action cannot be so controlled. Broadly speaking, the submucous injection of adrenalin may be likened to the subcutaneous injection of a dose of morphine, the effect of which is independent of the solution strength at which it is introduced.

Possibly Dr. Bennett intended to convey that he would reduce the actual dose of adrenalin employed in addition to diluting it, although he does not say so; but even in that case, as neither he nor any one else knows what may constitute the minimum lethal dose of adrenalin for the human chlorformed subject, I would strongly dissuade him from trying experiments of this nature.

Your columns, Sir, have recently testified to an abundant clinical confirmation of my original observations upon the toxic action of adrenalin under chloroform, and I am surprised to find that this dangerous combination is still in use. The technical point involved in nasal operations is, I understand, one of convenience only, and the risk of a human life is surely a heavy price to pay for it.—I am, etc.,

London, W., Aug. 28th. A. GOODMAN LEVY.

RESPIRATION AND METABOLISM IN CARDIO-RENAL PATIENTS.

SIR,—The JOURNAL of August 23rd, in reporting the proceedings of the International Congress (Section of Pathological Chemistry, page 465), credits me with the statement that certain cases of cardio-renal disease, in which an acid intoxication has been found, differ from cases of true uraemia. This report is not correct.

In speaking at the Section I laid especial emphasis upon the relation of "cardiac" and "uraemic" asthma, and stated that our results gave distinct support to the view that these forms of breathlessness have exactly the same underlying cause—namely, the same form of acid intoxication. This statement was, in fact, the chief suggestion of our communication.—I am, etc.,

University College Hospital Medical School, Aug. 30th. THOMAS LEWIS.

ASSISTANT MEDICAL OFFICERS IN ASYLUMS.

SIR,—In the interim report of the committee appointed by the Medico-Psychological Association to investigate the conditions of service of asylums medical officers, out of 109 medical superintendents to whom circulars were sent for information it appears that 16 had not the courtesy even to reply regarding their senior A.M.O.'s conditions and 37 regarding the second A.M.O.'s. I do not think further evidence is really necessary to show the unwillingness of many of them to do anything to alter the present evil conditions under which members of their own profession live. Human nature appears to be addicted to a kind of mental anaphylaxis—living an isolated life under derogatory conditions appears to render one increasingly less resistant to "the slings and arrows of outrageous fortune"—and many a promising career has been blighted by the conditions incidental to A.M.O.'s asylum work, for which conditions medical superintendents have in the past been very largely responsible. I recently heard that a certain superintendent gave as his reason for not giving facilities to his senior assistant medical officer for marriage that after some years of work if these officers did not get a superintendency they should leave the service. There are many gentlemen holding the position of superintendents well known to be strongly opposed to the present order of things, but there are others I regret to say.—I am, etc.,

August 26th. COMMON JUSTICE.

Medico-Legal.

THE QUESTION OF CONSENT TO OPERATION.

WUPAN writes: In the case of a boy, say, aged 15 to 17, suffering from an ordinary inguinal hernia, his parents having given their consent for operation but he being unwilling, can he be made to undergo the operation?

*** As the boy is over 14 years of age, and has arrived at what at law is called "years of discretion," it would be very unwise of a medical practitioner, except in a case of urgent necessity, to perform an operation without his consent. After the age of 14 an "infant" at law is competent to perform certain legal acts, and his consent should be obtained before performing any operation that is not imperative.

CERTIFICATES FOR INSURANCE COMPANIES AND CLUBS.

M. H. F. writes: What is the usual custom among medical men about certificates asked for by relatives of deceased for insurance companies and the clubs? These certificates are asked for when they come for ordinary death certificate. I refuse them, because by giving them one does the registrar of deaths out of a few shillings. I find the people are quite willing to pay me for these certificates.

*** It is the usual custom among medical men to refer applicants for such certificates to the registrar, as that official only can give certificates that are legally valid. In all cases where insurance money is claimed by the executors of deceased persons, it cannot be legally paid over without a certificate which shall embody therein evidence that the death has been properly registered, and only the local registrar can certify as to this.

The Services.

THE ROYAL NAVY MEDICAL SCHOOL.

THIS school was established at the Royal Naval College, Greenwich, on the recommendation of the Durnford Committee, it being considered desirable that the Naval Medical Service should, through its school, be in touch with the principal civil medical schools and institutions in London, should have opportunities of making use of the chemical laboratories at the college, and should be in close proximity to the Dreadnought Seamen's Hospital and the London School of Tropical Medicine. It is situated in the Queen Anne block of the college, and was opened on May 1st, 1912. It consists of a lecture theatre, laboratories, research rooms, museums, animal rooms, and all the necessary rooms for the study and teaching of general and naval hygiene, clinical pathology, tropical medicine and microbiology.

In conjunction with the Medical School at the Royal Naval Hospital at Haslar, it serves the same purpose in the Royal Navy as the Royal Army Medical College at Millbank does in the army. There are three distinct courses laid down, and each of these occurs twice a year. The courses are: (*a*) For Acting Surgeons, of two months' duration, the remaining four months being spent at Haslar; (*b*) for Surgeons, prior to examination for promotion to Staff Surgeon, of five months' duration; (*c*) for Senior Medical Officers—namely, Fleet Surgeons and Senior Staff Surgeons—of three months' duration. The average number of officers undergoing these courses is about 80 per annum.

The teaching staff, which will probably be augmented in the near future, is at present as follows: Professor of Micro-Biology, etc., Fleet Surgeon P. R. Bassett-Smith, R.N., C.B., M.R.C.P.Lond., M.R.C.S.Eng, L.S.A., Dipl.Trop.Med. and Hygiene Camb.; Professor of Hygiene, etc., Fleet Surgeon A. Gaskell, R.N., F.R.C.S.Eng., L.R.C.P.Lond., D.P.H.Lond.; Professor of Chemistry, Professor Vivian Lewes, F.I.C., F.C.S.; Instructor of Chemistry, J. S. S. Brame, Esq., F.C.S.; Director of Medical Studies, Fleet Surgeon A. Gaskell, R.N.

ROYAL ARMY MEDICAL CORPS (T.F.).

FIRST LONDON DIVISION.

THE annual training of the field units of the Royal Army Medical Corps, First London Division (T.F.), took place on Salisbury Plain in August, under the direction of Colonel J. Harper, M.D., A.D.M.S. The following units attended: First Field Ambulance, Lieutenant-Colonel R. R. Sleman, V.D., M.D.; Second Field Ambulance, Lieutenant-Colonel W. Salisbury Sharp, M.D., F.R.C.S.I.; Third Field Ambulance, Lieutenant-Colonel J. R. Whait, M.D.; and the First Sanitary Company, Major L. T. Bryett, M.D. During the training the units were inspected in field work by Colonel M. W. O'Keeffe, M.D., Inspector of Medical Services (War Office), who expressed himself as pleased.

On Saturday, August 9th, the sports competition took place. Such events as driving, tug of war, operating, and bell-tent pitching, and V.C. races were held. The judging was done by Colonel T. J. O'Donnell, D.S.O., Army Medical Staff, who awarded the challenge cup presented by Major E. Miles, F.R.C.S., to the First Field Ambulance, who won by 110 points. This unit has now won the cup three years in succession.

On Tuesday, August 12th, the three Field Ambulances competed for a handsome challenge vase presented by Major E. Waggett, M.B., which is given for tactical medical training. The scheme arranged by the general staff was that Sidbury Hill and Tidworth Pennings had been occupied by the advanced guard of a Red force, with pickets on Windmill Hill.

The three Field Ambulances formed part of the White force which attacked Sidbury Hill and Tidworth Pennings at dawn. Later on in the morning the Red force retired, and the three field ambulances established dressing stations and tent sections. Commanders of sections were required to hand in at the rendezvous their appreciation of the situation and a copy of all orders issued by them. The work was generally well done and was most interesting; each section turning out just as if mobilized for active service. The judges were Colonels T. J. O'Donnell, D.S.O., and G. S. McLoughlin, D.S.O. When the work had been finished the two examiners met and awarded the vase to the First Field Ambulance and afterwards critized the work.

The winning section was commanded by Major E. W. St. Vincent-Ryan, who had as his officers Captains A. Elliot, M.D., M.R.C.P., and D. C. L. Fitzwilliams, F.R.C.S.

TERRITORIAL FORCE.

THE KING has conferred the Territorial Decoration upon the following officers of the Territorial Force, R.A.M.C.: Lieutenant-Colonel William S. Sharpe, M.D., Second London (City of London) Field Ambulance; Lieutenant-Colonel Eustace M. Callender, M.D., Second London (City of London) General Hospital; and Captain John Bradford and Captain Hugh Dickie, Retired List, attached to units other than medical units. Surgeon-Major Thomas H. Dickson, M.B., Retired List, Fifteenth (City of London) Battalion, London Regiment (Prince of Wales's Own, Civil Service Rifles) has also received the decoration.

Medical News.

ON the occasion of the opening of the winter session in the Faculty of Medicine of the University of Birmingham on October 7th an evening reception will be given by the Dean and other officers of the Faculty, and an address on present-day problems relating to the antiquity of man will be delivered by Professor Arthur Keith, F.R.S.

THE annual dinner of the old students of St. Bartholomew's will take place on Wednesday, October 1st, in the Great Hall of the Hospital, Dr. Howard Tooth being the chairman. The corresponding events at St. George's, at St. Thomas's, and the Middlesex will also take place on October 1st, the respective chairmen being Mr. Adams Frost, Dr. H. P. Hawkins, and Sir J. Kingston Fowler.

A SHORT course of training lectures on tuberculosis for women sanitary inspectors and health visitors and those whose duties include the visiting of cases of phthisis will be delivered at the Royal Sanitary Institute on Wednesdays during October by Dr. J. E. Squire. The fee for the course is 5s., and further particulars can be obtained from the Secretary of the Institute at 90, Buckingham Palace Road, London, S.W.

THE eighty-fifth meeting of German Naturalists and Medical Practitioners will be held, as already stated in the JOURNAL, at Vienna in September (21st to 28th). The chief medical feature of the meeting will be a general address on the prophylaxis of diphtheria by Professor von Behring of Marburg. Among other important communications promised are the development of the light and colour senses in the animal kingdom by Professor von Hess of Munich; vision by Professor O. Lummer of Breslau; and the problem of race crossing in man by Professor E. Fischer of Marburg.

SIR JAMES WHITNEY, Prime Minister of Ontario, at the opening ceremonies of the new Toronto General Hospital on June 19th, stated that it had been decided to appoint a commission to investigate the whole subject of medical education and the practice of medicine in Ontario, the object being to acquire information upon which to base legislation for every imaginable application, in order to regulate and control all the interests of the province. The term "medicine" will include all places and means of alleviating or curing human defects, disorders, diseases, or wounds. The investigation will include osteopathy, dental schools, nurses, training schools, as well as opticians and their training. It will also include the practice of any branch of medicine by Christian Scientists or by any other class or sect.

Obituary.

ANDREW CLARK, F.R.C.S., D.Sc.,

HONORARY SURGEON TO THE KING; CONSULTING SURGEON, MIDDLESEX HOSPITAL.

MR. ANDREW CLARK, whose death was announced in the JOURNAL of September 6th, was born in Gloucester Terrace, Hyde Park, on June 1st, 1847, the only child of Benjamin Clark, F.R.C.S. Both his parents dying when he was a very young boy, he was sent to live with his grandfather, Andrew Clark, at Greenford Place, near Harrow. From there he was sent to school, first to Brighton College and later on to University College School. At the age of 17 he determined on the medical profession for his career, and migrated to the neighbouring University Hospital School. He obtained the L.S.A. in 1868 and his M.R.C.S. in 1869, and commenced his long association with the Middlesex Hospital as house-surgeon in April, 1870. Six months later he was appointed to the office of resident physician's assistant—a post corresponding to the house-physician of nowadays. His work was so good that in the following year he was promoted, at the early age of 24, to the general staff as assistant surgeon—a post that had become vacant consequent on the appointment of Mr. George Lawson to be fourth surgeon to the hospital. In those days the fellowship of the college was not a *sine quâ non* for candidates for appointments on the surgical staff, and, as a matter of fact, Clark did not obtain this distinction until he had been assistant surgeon for about two years. His early years as assistant surgeon were very busy ones, for, in addition to his duties in the out-patient room, he acted as surgical registrar for two years, and, after relinquishing this post, he became, jointly with Dr. Sydney Coupland, tutor to the medical school. In 1875 he was appointed surgeon to the ear and throat department, then instituted for the first time as a special department, and the following year he became Dean of the medical school.

Clark's appointment as Dean was, perhaps, the most important step in the whole of his professional career, and probably largely influenced his subsequent work. As Dean he came into intimate association with the students, and therefrom came the friendships which in a very large number of cases persisted after the tutorial days of studentship were over, and, indeed, followed Clark through the whole of his life. He was, in fact, a very successful Dean, not only from an official point of view, but because he had a touch of personal magnetism which was essentially human in character. The boys liked him, and from that not a few of them learnt to admire his character and to try and earn for themselves his appreciation. This meant that the school began to flourish and the numbers to creep up, so that when Clark relinquished his Deanship in 1887 the school occupied a foremost position among the other great London schools of medicine.

Relinquishing the charge of the ear and throat department in 1880, Clark was appointed, in conjunction with Mr. (now Sir) Henry Morris, to be lecturer on practical surgery, and two years later he also took over the operative surgery classes. On Morris giving up the lectureship in practical surgery in 1885, Clark assumed sole charge of the work, a post which he continued to hold till 1894, when he succeeded to the lectureship on surgery.

He was the author of the *Middlesex Hospital Surgical Reports*, 1872–3; *Ambulance Lectures* (1888); and he was editor of the fourth edition of *Fairlie Clarke's Manual of Surgery*.

Though fortune favoured Clark in the matter of his appointment on the general staff when very young, he in the long run gained little, for he had to serve an apprenticeship on the junior staff for sixteen years before he was appointed fourth surgeon in 1887. This appointment did not carry with it so many beds as were allotted to each of the three senior surgeons, and it was not until 1895 that he obtained the full rank of surgeon and all its attendant privileges. This was hard luck, but Clark was never one to grumble or try to snatch favours for himself by creating disturbances with his colleagues, a not unusual method of "getting on" with some men. Even after his appointment to be fourth surgeon he did not entirely sever his connexion with the out-patient department, for in 1887 he took charge of the special cancer department, which he managed for nine more years.

His work at the hospital pursued the even tenour of its way until 1906, when he had the misfortune to cut his hand badly when operating on a septic case. Severe cellulitis of the hand and arm were the result, and from this he ultimately made what seemed to be a complete recovery. The appearance was fallacious, for not long afterwards he began to develop a train of nervous symptoms which gave his friends great anxiety, and which very gradually converted the hale and hearty surgeon into a chronic invalid. The symptoms from the first assumed the character of a rheumatoid arthritis, accompanied by severe wasting of certain groups of muscles, notably the deltoids and the muscles of the forearms and hands. From there the wasting spread downwards along the muscles of the back to the glutei and leg muscles, so that his upright carriage slowly altered to a pronounced stoop and a rather shuffling limp.

Clark, always optimistic and cheery, was ever sanguine of improvement, and pluckily held on to his work, though with ever-increasing difficulty, until December, 1907, when the loss of power in his hands was too great to permit him any longer efficiently to carry out his duties as surgeon. He then placed his resignation before the Weekly Board of the hospital, and in February, 1908, was appointed consulting surgeon to the hospital. He was 61 years of age when he severed his connexion with the active staff after a continuous service of thirty-five years carried out without a single break from ill health until the misfortune which occurred two years before his retirement.

Clark's work at the hospital was always extremely conscientious and thorough. He was an enthusiast in his profession, and though he had many interests apart from the hospital, they were nearly all of them in some way associated with surgery and medicine. He loved his work, and worked as one that loves, and his example was infectious to those with whom his work brought him in touch. He was an excellent diagnostician, an excellent clinician, and was, moreover, very successful as an operator. Trained during the transitional times between sepsis, antisepsis, and asepsis, when exact pathology was in its infancy and laudable pus dominated the surgical horizon, Clark was always more interested in the practical rather than in the theoretical side of his art, and his teaching was essentially of this character. He taught men to observe signs and symptoms, and to apply to them the rules of good surgical common sense, and was a most popular and successful teacher of students on this account.

His personality had, too, no small a share in winning him the love and esteem of both students and colleagues. For there was something about the man which endeared him to those with whom he worked. That something was the manly, straightforward uprightness of his character. Clark was essentially a simple-minded man. Scrupulously honest himself, he was curiously unsuspicious of dishonesty in others. This trait led him always to speak directly as he thought and to think exactly as he said. There was never anything behind Clark, and you could be sure that what he said to your face was exactly what he would say behind your back.

Everybody who knew Clark very speedily found out the true meaning of the word "gentleman," and thus he made friends innumerable among those with whom he worked. His nature, prone to see all that was best in a man, unfortunately too often prevented him from discerning the other side, and thus he not infrequently was deceived by those he trusted, and too late on more than one occasion he had cause to regret his confidence. There was, however, no sort of weakmindedness or lack of fibre in Clark. The very honesty of his nature made him a vigorous and powerful opponent, and if he made up his mind to a certain course of action he would pursue it with his greatest effort in the face of any opposition. The knowledge that he was actuated by the best motives was usually sufficient to prevent him from exciting the resentment or sacrificing the friendship of those who were most heartily in opposition to him.

Clark's work at the hospital, great though it was, was only one part of his life's work. He was throughout the whole of his medical career an ardent supporter of the medical side of volunteering, and when the Volunteers were displaced by the Territorial system he continued his services, and rose to the highest rank in the Territorial Service that any man could attain. Of this part of his

Andrew Clark
A. M. S. (T.)

work others with greater knowledge than the present writer will speak, but it may be mentioned in this connexion that in 1895 he was made an Honorary Associate of the Order of St. John of Jerusalem, and in 1906 the honour of a Knight of Grace of the same Order was conferred upon him.

Another aspect of his life was his work with the British Medical Association, which took an immense amount of his time. As in the case of all his work, Clark threw himself whole-heartedly into promoting and widening the cause of the Association, and probably no man has ever worked harder and more disinterestedly than he did for its welfare. Of this, again, there are others closely united with him in this work who will speak with intimate knowledge, and its record can best be left to their labour of love.

Any one who reads this outline of Clark's career will at once appreciate the enormous amount of work that he did without any monetary interest or, as the world would put it, "for nothing." Indeed, it is one of the outstanding features of his life that he was particularly attracted by work which offered no reward but the satisfaction of benefiting his profession, his country, or both. Not that Clark was indifferent to money more than most people in so far as personal comfort was concerned, but he was blessed with a certain competence of his own which placed him beyond the absolute necessity of earning bread-and-butter, and he was absolutely free from the desire to amass wealth. His private income placed him in the position of being able to neglect the sordid side of work, and he was delighted thus to be able to spend his energy in work for the general good. And spend it he did. Until the beginning of his last and only illness in 1906 there was never a man who worked harder and got less for it than Andrew Clark, and the profession owes him a deep sense of gratitude for his unsparing, unselfish, untiring devotion. Somewhat late in life Clark did obtain some public recognition of his services, for in 1904 the honorary degree of D.Sc. was conferred upon him by the University of Oxford, and in 1910 he was made Honorary Surgeon to His Majesty King George V.

To complete the summary of his work without mention of the Middlesex Hospital Club, which Clark founded and practically ran for over thirty years, would be to neglect a work in which he took the greatest interest, and which has done not a little for the good of the Middlesex Hospital School. The club was founded to bring together old Middlesex men at an annual dinner where old friends could once more meet and discuss memories of a delightful past, and renew acquaintance with the doings of their Alma Mater. On these lines the club has flourished and will now continue to flourish, but it is all due to Andrew Clark, and is one more link in the chain of his unselfish life's work.

Outside his work Clark was essentially a family man. In 1876 he married Mary Helen, eldest daughter of Joseph Hargreaves, of Wellesley House, Princes Park, Liverpool, by whom he had one son and five daughters. Clark rejoiced in his family, and spent his life when away from his work in their midst. His wife, his children, and his garden were his pleasures, and the latter was more than a passing interest in flowers. He was a keen practical gardener, with a special and rather strange liking for hideous uncanny cacti, of which he collected an unholy quantity, which he was wont to display with pride to the surprised and ignorant visitor. He had a beautiful garden at Cowley Grove in which he took the greatest delight until failing health deprived him of the power, and he would spend an afternoon in chasing the green fly or squashing the red spider with the same enthusiasm and zest that he displayed in hunting for an intestinal obstruction or disintegrating a urinary calculus.

The last phases of his life were rapid in their progress. About the beginning of the present year he began to show obvious signs of cardiac weakness. An attack of influenza in the early spring accentuated the heart trouble, and not long afterwards commencing anasarca of his feet and legs deprived him of much power of moving about. Five weeks before his death he took to his couch, rarely leaving it except for meals, and he rapidly grew more feeble. He took his illness in the same matter-of-fact way that he did everything in his life, and up to the last he displayed keen interest in all that was going on around him. His mind was clear right to the end, and he passed away peacefully in his sleep on the afternoon of Friday, August 29th.

Truly a good man, and the good that he has done will surely live. R.I.P. A. L.

Some time ago it was proposed to present Mr. Clark with a testimonial in recognition of the great services rendered for many years to the Middlesex Hospital Club. At the club dinner, held on June 6th, Dr. Bernard F. Hartzhorne brought the subject to the notice of the members present, all of whom signified that they would be very pleased to subscribe for some token of esteem to be presented to Mr. Clark. We are informed by Dr. Hartzhorne, who is honorary treasurer of the fund, that 119 members of the Middlesex Hospital Club have subscribed a sum of over £50 in subscriptions limited to half a guinea, for the purpose of making a presentation to Mr. Clark on his retirement from the position of secretary and treasurer of the club. This position he had held for thirty years. Had circumstances allowed, this presentation would have been made in the autumn.

TRIBUTE FROM A COLLEAGUE.

Sir ALFRED PEARCE GOULD writes:

Although Andrew Clark and I were fellow students at University College Medical School for two years in the late Sixties he was so much my senior that we were never class-mates, and I have no recollection of him as a student. Passing to Middlesex Hospital almost immediately after qualification he was thirty-seven years an active member of its staff, and his professional life was very intimately associated with it and its medical school. We were colleagues on the active staff for twenty-five years and friends for over thirty years, and as I now look back upon his completed life-work the characteristics that loom largest are his singleness and purity of aim and the strenuous devotion with which he served. His life was a very full one, and he took a more active share in the work of the hospital and of the school than falls to the lot of most of us. In the hospital he was not only successively assistant surgeon and surgeon, but he organized the department for diseases of the ear and throat and was surgeon to it for five years. Similarly, he was the first surgeon to the children's department, and for seven years was surgeon to the cancer out-patient department. In the school he not only took his full share in teaching—being a lecturer in all for twenty-nine years—but for ten years he filled the office of Dean, and in this capacity gave ungrudgingly of his time and ability, and was rewarded not only by the loyal confidence of his colleagues and of the students, but by the growing prosperity of the school. In addition to all this he took a leading part in the extra-academical interests of present and past students. He rendered most efficient help to the Students' Medical Society; later on he was treasurer of the Amalgamated Students' Club. But his best work of this kind was in connexion with the Middlesex Hospital Club, which is a union of past students partly to foster friendship with one another and loyal service to the hospital, and partly for philanthropic ends. Andrew Clark was largely instrumental in founding this club; he was its treasurer and secretary for over thirty years, and only resigned a few weeks ago when his health failed. He served this club with unstinted labour and the most loyal devotion, and its success is almost entirely due to him. At its last meeting his resignation was most regretfully accepted, and this was accompanied by the strongest expressions of affection for him personally and of gratitude for the successful way in which he had watched over the interests of the club from its foundation.

When one remembers that Andrew Clark's public work extended far beyond his hospital and school—to the British Medical Association, the Volunteer movement, the medical department of the Territorial Force, St. John Ambulance Association—it is impossible not to admire the way in which he worked and filled his days with unselfish service. His singleness of aim must have impressed all who knew him; no one can ever have associated with him any selfish aim or unrevealed purpose, and with this there was blended a most loyal devotion to colleagues and institutions with which he was connected. And so all who knew him held him in the highest regard; and it is pleasant to recall

that this unselfish, hard-working man not only won the affection of his associates, but also received such outstanding honours as the appointment of Honorary Surgeon to H.M. King Edward VII, the degree of D.Sc. of the University of Oxford, the Gold Medal "for Distinguished Merit" of the British Medical Association, and that he was made a Knight of Grace of St. John of Jerusalem. To very many who worked with him through long years Middlesex Hospital will not be the same now that Andrew Clark has gone: the sense of loss is real and deep.

MR. CLARK AND THE ASSOCIATION.

Mr. Clark's connexion with the British Medical Association was long and intimate, and the service he gave it was unstinted and most valuable. At one time or another he was on almost every committee, and he held all the highest offices. He was an excellent example of the kind of man whom the Romans described as *vir pietate gravis*—a man who at a committee or meeting of any kind, even when he remained silent through its debates, stood for sound sense and absolute straightforwardness. He kept steadily in view the honour of the profession and the prosperity and efficiency of the Association. The mere list of his offices serves to show the implicit trust he inspired among his fellow members. In 1892 he was elected to the Central Council as a representative of the Metropolitan Counties Branch; this position he continued to hold till June, 1899. In July, 1899, he was elected treasurer, and that office he held till 1902, when he was elected Chairman of Council. On the expiry of his term of office in 1905 he again sat on the Council as representative of the Metropolitan Counties Branch. In 1906 and again in 1907, 1908, and 1909 he was co-opted a member of the Council. In 1910–1911 he was elected to the Council by the Representative Meeting; in 1912, owing to failing health, he resigned office. Much of his work was done as a member of the various committees on which he sat. He was a member of the Arrangements Committee before the Montreal meeting in 1896 and the Edinburgh meeting in 1897. In connexion with the Annual Meeting held in London in 1910 Mr. Clark was Chairman of the Dinner and Luncheon Committee, and also of the Executive Committee. He was on several occasions a member of the Journal and Finance, the Premises and Library, the Scientific Grants, the Trust Funds, and the Organization Committees. He was elected a member of the first Journal Committee in 1910 and of the first Finance Committee in the following year. As Treasurer and Chairman of Council he was an *ex officio* member of all committees, and thus his services extended over a period of twenty years. Mr. Clark took a special interest in the organization of the Volunteer Medical Service; the active part he took in this important work is fully described further on by some of those who were most intimately associated with him in it. Here it need only be said that in 1909 he was chairman of the Territorial Forces Committee, on which he also served in 1910. In recognition of his great and self-sacrificing labours on behalf of the profession, Mr. Clark was elected a Vice-President of the Association, a post which he held at the time of his death. At the Annual Meeting held at Cheltenham in 1901 he was Vice-President of the Section of Navy, Army, and Ambulance, and at the Annual Meeting held in London in 1910 he presided over the same Section. He was President of the Metropolitan Counties Branch in 1905–6; in the address which he delivered from the chair on that occasion he gave a striking account of the influence exerted by the British Medical Association on the advancement of science. In 1905 Mr. Clark's services were recognized by the award of the Gold Medal of the Association. The following resolution was passed by the Council at a meeting on July 5th of that year:

> That the Gold Medal of the Association be awarded to Andrew Clark, D.Sc., F.R.C.S., on account of special services rendered by him to the British Medical Association.

The late Sir Constantine Holman was awarded the medal at the same time. On that occasion we said in a leading article,[1] referring to the honour done to Mr. Clark: "Upon Mr. Clark's work for the Association it is unnecessary to dwell. He has held with signal success the most responsible official positions during a period of transition when statesmanlike breadth of view, clearness of insight, and mingled firmness and tact were especially needed. How conspicuously the late Chairman of Council has displayed these qualities is known to all whose privilege it has been to work in any capacity with him."

[1] BRITISH MEDICAL JOURNAL, August 5th, 1905, p. 290.

Mr. T. JENNER VERRALL (Chairman of Representative Meetings) writes:

As one whose work in the Association brought him into continual contact with Mr. Andrew Clark I should like to add a few words of personal appreciation.

If I select one quality as specially characteristic of Andrew Clark, I would say his "lovableness." We spoke of him as Andrew Clark, rarely in any other way, and I think that it is men of his type, who bring into their public life something of the affection of the domestic circle, for whom the Christian name prefix is generally used.

His quiet manner, soft voice, and charming smile were equally effective in ordinary conversation and in a large meeting. These, when joined to a keen zeal for work, sufficiently explain the very marked influence he possessed, both in the Council of the Association and over the members generally. In the long period upon which this influence acted we passed through many difficulties, arising sometimes from external causes, sometimes from crises within our own boundaries. In all these the value of Clark's "sweet reasonableness" was great. This, more particularly, in that his softness of nature produced no weakness in action.

He could wax indignant over some general professional grievance or some lapse from professional propriety, showing at the same time an almost tender regret that there should be such things or such men.

No man has more worthily held the important posts wherein Andrew Clark served us. Failing health withdrew him from active work some time before the shadow of recent troubles fell on us. Had it been otherwise, how ready would have been his help and sympathy, how wise his counsel!

In talk with him not long ago I found that, as was to be expected, he had watched most anxiously every phase of our campaign, sympathized with our protests, and appreciated our difficulties.

The Association acknowledged in the clearest fashion its sense of gratitude to him, and I know it was a joy to Clark that, in giving up his work among us, he left none behind but friends.

Dr. ROBERTS THOMSON, President of the Association in 1891, formerly President of Council (1899–1901), writes:

By the death of Mr. Andrew Clark the British Medical Association has lost one of its most devoted members. For many years administrative work in connexion with the Association formed the chief interest of his life, and he gave up much time and laboured unwearingly to promote what he considered would tend best to advance the welfare of the profession and the prosperity of the Association.

The posts he held, and the numberless committees of which he was a member, gave him opportunities of which he fully availed himself, and that the Council appreciated the labour he had so freely given and the energy with which he had thrown himself into the work he was called upon to do, is shown by their bestowal of the Gold Medal, the highest honour in their power to offer to any member. I know how highly he valued this mark of the Council's goodwill, and how greatly he prized it.

During the time it was my privilege to preside over the deliberations of the Council Mr. Andrew Clark was treasurer, and I had, therefore, full opportunity of knowing how devoted he was to the best interests of the Association, and how anxious he was that no effort on his part should be spared to advance whatever would tend to that end.

It was a difficult and a trying time in the history of the Association. While some might think that Mr. Clark did not form his opinions quickly, nevertheless he had a very calm judgement, and his influence in moderating the views of those whose enthusiasm was leading them to go at too fast a pace had much value.

This generation has some difficulty in setting a proper value upon the influence of such men as Mr. Clark at

a time when the whole constitution of the Association was in the melting-pot. But the influence he exerted was great. His views were always calmly urged, and he could keep his head when there was something of a storm. Such men are all too few. He has left his mark for good in many a direction in the history of the Association, and he is one of those whom we can ill spare.

Others can speak of his devotion to his military duties. I know how much he did in connexion with this most important work. But while he gave up much time and bestowed much labour upon these duties also, I am sure I am right in saying that the Association came first, and its affairs occupied the most important place in his thoughts.

MR. CLARK AND THE TERRITORIAL FORCE.

Lieutenant-Colonel E. M. WILSON, C.B., R.A.M.C. (Ret.), writes:

The Territorial branch of the Royal Army Medical Corps has sustained a severe loss in the sad death of Colonel Andrew Clark. He joined the Volunteer Medical Service as Surgeon to the then 4th West London Volunteer Battalion of the Middlesex Regiment, and, passing through the intermediate ranks, was appointed Senior Medical Officer of the 3rd London Volunteer Infantry Brigade in December, 1889. Promoted Honorary Surgeon-Colonel in 1905, he was selected for the position of Assistant Director of Medical Services of the 2nd London Division, Territorial Forces, in 1908, with the rank of Colonel in the Territorial Forces. He was one of the first medical officers in this position to receive the distinction of King's Honorary Surgeon, which was conferred on him in 1910. At the termination of his appointment as A.D.M.S. he retired in 1912.

Throughout his long association with the Volunteer and Territorial Medical Services Colonel Clark's efforts were consistently devoted towards greater efficiency and uniformity in the branch to which he belonged. In 1906 he was appointed chairman of a special committee of the British Medical Association to consider and report upon the various conditions under which medical officers were then serving in the Territorial Forces and Army Medical Reserve. The recommendations of that committee might be briefly summed up as advising that there should be one corps—the R.A.M.C.(T.)—one uniform, one badge, one title, and that the then existing bearer companies and field hospitals should be converted into field ambulances to bring them into agreement with the organization of the regular army. These recommendations, submitted by the Council of the British Medical Association, were accepted in principle by the Secretary of State in 1907.

In a subsequent committee on the medical branch of the Territorial Forces, which sat in 1909–10 under his chairmanship, important recommendations were made, both to the county associations and War Office, relating to the general hospitals and field ambulances of the Territorial Divisions, and in most instances these suggestions have since been adopted.

Colonel Clark's interest in matters connected with ambulance work was not confined solely to the Volunteer (now Territorial) Medical Service. Although an exceptionally busy man, he found time to instruct classes in ambulance duties, and a volume of ambulance lectures was published in 1888. He was appointed an Honorary Associate of the Order of St. John of Jerusalem in 1895, and advanced to the grade of Knight of Grace in 1906. He was also a member of the committee of the British Ophthalmic Hospital in Jerusalem from 1909, and was a constant attendant at meetings of the committee until shortly before his death.

I think all who have been connected with him in any of these important services must have appreciated his sound practical knowledge of the various subjects, his kindly nature, his patience, and the tact he displayed in dealing with men, and matters which often involved conflicting interests, and I am sure his loss will be deeply regretted by a very wide circle of friends in many branches of public life.

Colonel GEORGE S. ELLISTON, C.B., writes:

Andrew Clark was one of the early pioneers of the ambulance movement, and worked hard to familiarize the public with its usefulness by giving courses of lectures on "First Aid" and "Home Nursing" at the London Polytechnic Institution. These classes were carried on in his leisure time for some years, and the Order of St. John of Jerusalem recognized his services by enrolling him as an Honorary Associate of the Order.

Colonel Andrew Clark will long be remembered in the history of the Volunteer movement by the active interest he took in developing and improving its medical organization. On the formation of the force into infantry brigades in the years 1890–91, he was appointed Brigade-Surgeon-Lieutenant-Colonel to the West London Infantry Brigade, and in the early days of the Volunteer Ambulance School of Instruction became one of its vice-presidents. It is difficult to estimate the value of the work carried on by this school for many years with little or no official help or recognition, but there is no doubt that it had a very far-reaching effect not only on the Volunteer medical department but on the Regular Army Medical Service. For years it enabled Volunteer medical officers to obtain certificates of proficiency, and helped the training of officers, non-commisioned officers and men in the various branches of military medical work. This Volunteer Ambulance School may be said to be the forerunner of the present R.A.M.C. Schools of Instruction which have proved such a marked success in Sir Alfred Keogh's great scheme for organizing the medical service of the Territorial Force.

At the time Colonel Clark was Chairman of Council of the British Medical Association the Naval and Military Committee was formed, and much good work was carried out in helping to redress grievances of medical officers in the navy, army, and Indian Medical Service. It was about the year 1906 that it became apparent that the Volunteer force must undergo complete reorganization, and the British Medical Association called together a committee of Volunteer medical officers to discuss the medical aspect of the force. The committee consisted of the leading Volunteer medical officers representing the principal centres of England and Scotland, and Andrew Clark presided over it as its chairman. As a result of the deliberations of this committee, representations were made to the Secretary of State for War that the existing bearer companies and field hospitals of the Royal Army Medical Corps (Volunteers) should be consolidated into field ambulances for cavalry and infantry. The report of the Volunteer Medical Service Committee was made on June 19th, 1906, and it was a great compliment to the British Medical Association when, in the following year, Sir Alfred Keogh brought out his admirable scheme, which gave effect to the special representations made by this Committee.

When the new organization of the Territorial Force came into existence in March, 1908, Colonel Andrew Clark was one of the few distinguished medical officers that Sir Alfred Keogh gathered round him to make a start, and he received the important appointment of Administrative Medical Officer to the 2nd London Division. The able and efficient manner in which Colonel Clark carried out the duties during his four years of office is well known to all medical officers who served in the two London divisions. Having partly retired from active practice, he was able to devote the necessary time required for office work, which, although onerous, was to him a labour of love.

Substantial recognition of his services was made in the Birthday Honours list of 1910, when he was appointed an Honorary Surgeon to the King. Colonel Clark was very proud of this recognition, as he was the first Territorial medical officer to receive this honour. Amongst other honours he much valued was the promotion to a Knight of Grace in the Order of St. John of Jerusalem, and the degree of D.Sc. conferred on him by the University of Oxford.

Colonel P. BROOME GILES, C.B., writes:

I have known Andrew Clark since 1867, when we were students together at University College Hospital. Others, no doubt, can tell better than I of his strictly medical career, but I do not think any one can speak more than I of his association with the Volunteer and Territorial Forces. Clark began his Volunteer career in the old Victorias as a private, and late in 1873 obtained a commission as assistant surgeon to the 4th Middlesex, in which regiment he went through the usual ranks until 1889. He was selected as

a brigade surgeon, and had under his supervision the 2nd London Volunteer Brigade Bearer Company. On April 1st, 1908, he was created a substantive colonel and appointed A.M.O. to the 2nd London (County of London) Territorial Division. Previous to that, from October, 1907, he and I had been working hard to organize the R.A.M.C. of both City and County Divisions, neither knowing to which we should be appointed.

Between 1890 and 1908 Clark was chairman of the Volunteer Medical Association, and I am certain his quiet conciliatory manner did much for the medical department.

At the meetings of the Association of Senior Volunteer Officers, and of the Volunteer Ambulance School of Instruction, of which I was chairman, I always had a loyal colleague. Both at the Committee of the British Medical Association, appointed to consider the Medical Service of the Territorial Force, and on the Association Committee he did sound and good work; he gave evidence before the Duke of Norfolk Committee; and as a member of the Committee of the Junior Army and Navy Club did sterling service. Accidentally taking a house in Folkestone, I saw a good deal of him this year, and though it was evident he was not his former self, still no one thought the end was so near; and now I and hundreds of Territorial medical officers can only bear testimony to the courtesies of one whom we have known for years as a gentleman and a friend.

Surgeon-Colonel ATWOOD THORNE, R.A.M.C.(T.), writes:

Andrew Clark joined the 1st Middlesex Volunteer Rifle Corps as a private in 1867, and in August, 1873, he joined the 4th Middlesex Volunteer Rifle Corps as assistant surgeon, and thirty-five years later, at the passing of the Volunteer Force, he was, as Brigade-Surgeon-Lieutenant-Colonel and Honorary Colonel, still a member of that unit, though seconded as Senior Medical Officer of the 2nd London Brigade. The 4th Middlesex became part of a unit (13th County of London Battalion) of the 2nd London Division of the Territorial Force on its formation in April, 1908, and Andrew Clark, as the senior of all the medical officers, was naturally selected as Principal Medical Officer of the Division, with the rank of Colonel in the Army Medical Staff (T.F.); as such there fell to him the very onerous duty of forming and controlling all the medical details of the division. In the Woolwich companies of the R.A.M.C.(Vols.) and the 3rd London Bearer Company he found the nuclei of the three field ambulances required, but the two general hospitals and the sanitary company of the division had to be created *de novo*. It was here that Colonel Clark's administrative capacity, tact, and geniality were of so much use, as the only officers he had available were the Volunteer regimental medical officers, few of whom had any experience of administration; as for non-commissioned officers and men, it is difficult to know how they were obtained, but the units were gradually formed, and under Colonel Andrew Clark's direction they worked well. In addition, medical officers had to be obtained for the infantry battalions, artillery brigades, and departmental corps, many of which were freshly raised; it was in this work especially that he found his connexion with the British Medical Association so useful.

He was naturally an original member of the Territorial Force Association for the County of London, and worked hard on various subcommittees, chiefly those concerned in the provision of buildings and equipments for the units under his command.

In 1912, at the termination of the allotted period of four years, he retired from the Territorial Force, being succeeded by Colonel Harrison, C.V.O., formerly of the Brigade of Guards and in command of Millbank Hospital.

In 1892 he was given the Volunteer Decoration, and in 1910 he was appointed Honorary Surgeon to the King, a post which till then had been reserved to officers of the Regulars.

He was a Knight of Grace of the Order of St. John of Jerusalem, and did much to assist in the formation of Voluntary Aid Detachments, not only in the county of London, but in the county of Middlesex, where he resided.

In 1906 he was chairman of a committee of the British Medical Association to suggest improvements in the medical arrangements of the Volunteer Force: in 1908, at the inauguration of the Territorial Force, nearly all the suggestions of this Committee were adopted.

The following letter is from Major-General Vesey Dawson, C.V.O., formerly of the Coldstream and Irish Guards, the first General Officer Commanding the 2nd London Division:

Glydernscroft,
Marlow, Bucks.
September 9th, 1913.

Dear Colonel Atwood Thorne,

I was indeed sorry to hear of Colonel Clark's death, and I willingly comply with your request to send you some notes on my association with him in the Territorial Force.

Colonel Clark served on the staff of the 2nd London Division during the time (four years) that I had the honour to command the division, and voluntarily gave an enormous amount of his time and energy to forming and organizing the medical units of the division. His unfailing tact and good temper, and conciliatory manner of dealing with those with whom he was brought in contact, together with his great knowledge of the Volunteer Force, made him a very valuable staff officer, and the success that has attended the formation of the medical units of the 2nd London Division is, in my opinion, largely due to him.

I am deeply grieved at the death of one who was a charming companion, a staunch colleague, and a valuable adviser, and I feel sure that I am voicing the opinion of all ranks of the 2nd London Division when I say that we mourn the loss of a true friend.

Yours very sincerely,
V. DAWSON.

Colonel Atwood Thorne, V.D.

Colonel C. H. HARTT, R.A.M.C., T.F., late Commanding 5th Field Ambulance (2nd London Division) writes:

As one who served under the late Colonel Andrew Clark, R.A.M.C., T.F. (2nd London Division), I desire to bear testimony to his many good qualities, and to express the feeling of myself and others in the Territorial Force that his loss will be much felt among his old comrades and friends.

Before the passing of the Territorial Forces Act Colonel Clark held the rank of Brigade-Surgeon-Lieutenant-Colonel to the Volunteers. He had done much good work in connexion with stretcher bearers, and also St. John Ambulance, and was rewarded by being gazetted the first Administrative Medical Officer to the 2nd London Division at the same time that Colonel Giles, C.B., was gazetted to a similar position in the 1st London Division.

Having plenty of spare time he threw himself wholeheartedly into the work, and at his office in Craig's Court, Whitehall (with the assistance of his staff officer, Colonel Magill, C.B.), he directed the medical affairs of the 2nd London Division. He was a regular attendant at camp, and I had the pleasure of seeing him in his official capacity at Shorncliffe, Salisbury Plain (twice), and Whitstable. He served as administrative medical officer for four years, and upon expiration of his term did not seek reappointment. It was during his period of office that he was appointed Honorary Surgeon to the King.

His health was not good, suffering from rheumatoid arthritis, believed by him to have been of an infective character, contracted as the result of a wound during an operation at the Middlesex Hospital. He benefited by treatment at Aix, but never really recovered the proper use of his joints.

He was a kind-hearted man, of a genial nature, and beloved by all who came in contact with him.

DR. JOHN RAMSAY BISHOP, of Stalybridge, who died on August 25th, after an illness of some months, at the age of 44, received his professional education at Owens College, Manchester, and was admitted a Member of the Royal College of Surgeons of England and a Licentiate of the Royal College of Physicians of London in 1903. In his younger days he saw a good deal of the medical life in Edinburgh, and the splendid work, medical and surgical, done there, owing to the fact that his uncle, the late John Bishop, M.D., F.R.C.S., was assistant surgeon to the Edinburgh Royal Infirmary, and the friend and associate of Syme, Lister, Grainger

Stewart, and others who added to the glory of that famous school. Dr. Bishop commenced practice at Davenport House, Stalybridge, about fifteen years ago. For many years he acted as honorary secretary of the Ashton Branch of the British Medical Association, and his self-sacrificing devotion to the interests of his profession led him to throw himself heart and soul into the struggle over the Insurance Bill while it was before Parliament. Illness compelled him to resign his secretarial work early this year. The loss of his only child, a little daughter, was a great blow to him, and probably had a serious influence upon his own health. This and his resolution in performing his professional work when long rest and change of climate were urgently called for doubtless hastened his end. His loss is greatly mourned by his patients, who found in him not only a skilful doctor but a sympathetic friend. The funeral, which took place on August 28th, was largely attended. In Dr. Ramsay Bishop, absolutely straightforward and gentle as he was, but firm when duty called for the exercise of that quality, the profession has lost a man of a type that can ill be spared.

We regret to announce the death of Dr. SEVERIN LACHAPELLE of Montreal, which occurred suddenly a short time ago at Montreal in the 64th year of his age. He was born in 1850, and while studying at the Montreal College he joined the Canadian band of volunteers which was sent to Italy to join the forces gathered against Garibaldi. After two years of service he returned to Canada to complete his studies at the Victoria College of Medicine. In 1874 he began to practise at St. Constant, Quebec; two years later he removed to St. Henri, where the remainder of his life was spent. He took special interest in diseases of children, and gave much attention to the prevention of infant mortality. He was professor of medicine at Laval University, and superintendent of the Montreal Crèche. He was for a time Mayor of St. Henri, and from 1892 to 1896 was Conservative member of Parliament for Hochelaga.

DEATHS IN THE PROFESSION ABROAD.—Among the members of the medical profession in foreign countries who have recently died are Professor Bernhard Bardenheuer, the distinguished surgeon of Cologne; Dr. Borne, representative of the Doubs in the French Senate; Dr. L. Bourget, professor of therapeutics and pharmacology in the University of Lausanne, and joint author with Dr. S. Rabow of a work in German, *Lehrbuch der Arzneimittellehre* (Berlin, 1897), aged 57; Professor Victor Fossel, Emeritus professor of the District Lunatic Asylum of Graz; Professor Max Kassowitz of Vienna, one of the leading authorities in children's diseases, a prominent advocate of temperance in Austria, and a stalwart champion of vaccination, aged 71; Professor Naecke, a distinguished psychiatrist, director of the Royal District Asylum of Colditz (Saxony); Professor Rieder Pásha, formerly director of the Galhane Hospital, Constantinople, aged 52; and Dr. Preiser, the well-known orthopaedist of Hamburg, aged 36.

Public Health.

ENTERITIS AND DUST REFUSE.

THE Southwark Board of Guardians has been dealing with a serious outbreak of enteritis amongst the children at its infirmary. There have been 28 cases and 6 deaths, and Dr. H. W. Bruce, the medical superintendent, attributes the outbreak to refuse poisoning. In close proximity to the infirmary the Camberwell Borough Council has a refuse shoot on a railway siding, and the dust from this is blown into the institution. In addition the infirmary has been infested with flies, which have invaded the kitchen and stores, as well as the wards. Three years ago an unsuccessful attempt was made to induce the Camberwell Borough Council to abate the nuisance, and again an endeavour is being made to secure the abatement of the nuisance and the removal of the refuse tip. A month ago the facts were laid before the Local Government Board, and on August 25th Dr. Fletcher, one of their medical officers, visited the infirmary and inspected the dust heap. His report has not been presented to the guardians, who are desirous that the nuisance and cause of the outbreak shall be immediately removed. At their meeting on September 4th the clerk was instructed to communicate by special messenger with the Local Government Board, with a view to getting an early reply, which will be referred to the Infirmary Committee, which has received power to deal with the matter at once.

Letters, Notes, and Answers.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

"NICOTINE" asks for any facts in support or contradiction of the prevalent idea that cigarette smoking is more harmful than other forms, and in what the special harm consists.

C. E. L. would be glad to hear of an open-air school or sanatorium, moderate fees, suitable to an intelligent boy of 9 with asthma, where education can be carried on with due regard to health.

I. Z. I. writes: I would be obliged if any one could tell me of a better solvent for hard wax than warm oil. I mean the sort that has got so hard it can only be got away in small bits by prolonged syringing, and upon which oil seems to have no solvent power.

G. V. P. writes: Would any of your readers enlighten me on the following points: (1) Is salvarsan advisable in a case of inherited interstitial keratitis in a young man aged 18? Has it become a routine treatment in ophthalmic practice, and, if not, what are its drawbacks? (2) Chopped garlic, rubbed into the axillae, has a great reputation amongst malingerers for producing a considerable rise in temperature, and thus soldiers and others using it in this way are enabled to avoid service and to be placed on the sick list. Is there anything published on the subject?

A. J. writes: I should be much obliged for some hints how to treat the following case: Mrs. D. about nine weeks ago had her hat set on fire. She had a burn of the third degree, about the size of the hand. In due time I skin-grafted, and the wound covered completely over. Unfortunately she scratched a piece of the new skin off, and the wound spread rapidly until I put on boric compresses. Now the skin thickens in patches and comes off, leaving a raw surface, which takes some time to heal up. The itching is intolerable. I have tried boric compresses, boric ointment, scarlet ointment; but nothing seems to prevent the skin from coming off. I may state that otherwise she is perfectly healthy.

CITRATED MILK FOR INFANTS.

W. M. S. writes: I should be obliged if you will send me a good paper on "Citrated Milk for Infants." I do not want a paper describing how to give it, but one giving the reasons for its use.

*** The use of sodium citrate in infant feeding was first suggested by Sir Almroth Wright, who believed that its use would lead to the formation of a casein clot of less density within the stomach. Certainly the addition of three or more grains of sodium citrate to each ounce of milk in the test tube prevents the formation of the usual dense calcium-casein clot. The chemistry of this process has not yet, we believe, been thoroughly explained, and we know of no paper which deals at all fully with this aspect of the question. Numerous papers have appeared from time to time proclaiming the successful results of its use. The first was that read at a meeting of the British Medical Association in July, 1905, by Dr. F. J. Poynton. As a rule, the use of sodium citrate has been combined with the prescription of undiluted milk and the abandonment of the practice of enriching the mixture with large amounts of sugar. It is difficult to avoid the conclusion that some of the good effects of the change is due to the adoption of the whole-milk feeding. For the good effects of undiluted milk reference should be made to Professor Budin's famous book, *The Nursling*, which has been translated into English. Moreover, at the present day, the opinion is becoming generally held, especially in Germany and America, that the digestion of protein is comparatively seldom at fault in infants, and that the disturbing factors are mainly the fatty acids formed in excess by the fermentation of fats and sugar. The pharmacological action of sodium citrate is that of a mild antacid and saline cathartic.

ANSWERS.

PURCHASE OF MEDICAL PRACTICE.

SENEX.—1. The purchase price of a medical practice will vary with the class of practice. The average purchase price would be from one to two years' purchase. 2. A twelve months' introduction would be better than a six months' introduction, but would not necessarily raise the price of the practice. 3. The purchase price is usually based on a three years' average of the gross receipts. 4. The purchase price of many practices has been greatly affected by the Insurance Act, which in some cases has made them practically unsaleable. 5. Either the purchaser buys them at a valuation,

or they remain the property of the vendor, and the proceeds of the debts are paid to him as collected. 6. During the period of introduction the profits are either (1) shared equally between vendor and purchaser, or (2) for the first half of the time the vendor takes all the receipts, and pays all expenses, and for the last half the purchaser, or (3) one of them takes all the profits, paying all the expenses, and making an allowance to the other.

INQUIRER would be glad to know whether it is usual to purchase a practice on the gross or net receipts. Also how many years' purchase would be considered fair for a partnership extending over many years.

*** In estimating the value of a medical practice the gross receipts are always taken. With regard to the value of a partnership, that will depend a good deal on the class of practice. In a large number of cases a two years' purchase would be a fair estimation.

LETTERS, NOTES, ETC.

LICENCES IN DENTAL SURGERY.

THE Royal Faculty of Physicians and Surgeons of Glasgow should be added to the list of bodies which were mentioned in our issue of last week as granting a licence in dental surgery.

PSYCHOLOGICAL MEDICINE.

FROM a letter received from Dr. Hayes Newington, Treasurer of the Medico-Psychological Association of Great Britain and Ireland, we gather that the value of the Gaskell Prize awarded by this body is £45, not £30 as stated in our issue for last week. It is awarded as the result of a competitive examination in psychological medicine, open to all asylum medical officers, and carries with it a gold medal. The sum raised to commemorate the work of the late Dr. Hack Tuke has been devoted to the advancement of the association's library.

A POSSIBLE CASE OF PELLAGRA.

DR. J. FREDERICK SELKIRK (Shipley) writes: In the case described by Dr. Pilcher in the JOURNAL of August 30th I do not consider it is even a possible case of pellagra, as the patient has none of the classical signs practically. I think there is no doubt that it is a case of tuberculosis of the suprarenal bodies causing the discoloration of the skin.

HERPES AND VARICELLA.

DR. EDWARD HARRISON (Hull) writes: I have been interested in reading the letters on this subject in your JOURNAL, as three weeks ago I was called to see a mother who was suffering from shingles, and a fortnight later her baby, aged 3 months, developed varicella. We tried to account for it but failed to find any source of infection, so I think it desirable that I should record this case.

DR. HENRY OAKES (Rogate) writes: I have seen two children of one household to-day; one was a case of typical shingles and the other of typical chicken-pox. I do not know of any other case of chicken-pox in the neighbourhood. I merely mention the fact in view of the correspondence in the BRITISH MEDICAL JOURNAL at the present time.

DR. W. H. COATES (Patrington) writes: Following up Dr. Bruce and Dr. Roberts's experiences on August 10th, I was called to a gentleman farmer. He had exaggerated herpes on the abdomen of a close type, very painful, severe, and extensive. On August 24th his married daughter, who was staying with him, developed severe varicella of a large type, also extensive; she was 28 years of age. The eruption was so bad as to suggest small-pox. Her rash, however, rapidly died away, and no further developments took place. The father is only now convalescent. I was much puzzled with the varicella as there is none within twenty miles. This is the second time I have seen herpes followed by varicella in the same household. With the experience of your correspondents it would seem to be a suitable subject for bacteriological inquiry.

DR. HOWARD S. WILLSON (Weybridge) writes: On May 19th I visited a girl at a boarding school, and found she had typical herpes zoster. On June 1st another girl at the school developed varicella. On July 1st Mrs. P. called to see me. She had just returned from the seaside, and I found she had well-marked herpes zoster, which had commenced about three days before I saw her. On July 16th I was called in by Mrs. P. to see her only child, a girl of 5 years. The child was developing a characteristic varicella eruption. In neither instance could I trace any exposure to infection from a previous case of varicella. Mrs. P.'s child might have contracted the disease while travelling home with her mother on June 30th, but there was no evidence to make this anything more than mere supposition.

DR. W. W. WILLIAMS (St. Davids) writes: The correspondence in the JOURNAL reminds me of three curious cases that occurred in my practice years ago. I have no knowledge of any connexion between herpes and varicella, but the cases that I quote suggest to my mind that there is something in the pathology of herpes that is ill understood.

Case 1.—A mason, aged 70, previously very healthy, is seized rather suddenly with vertigo, aphasia, and complete loss of co-ordination. He was in such a condition that I came to the conclusion he had some serious lesion in the cerebellum. On the eighth or ninth day a severe herpetic eruption appeared over the left side of his neck, and *all the other symptoms disappeared immediately.* The herpes seemed to correspond to the distribution of a cutaneous branch of spinal accessory. His recovery was uneventful, and he lived till 83.

Case 2.—A strong farmer, aged 45, of a somewhat neurotic type. His symptoms were so multifarious that I will not attempt to enumerate them, but they suggested to me that he was hypochondriacal. On the fifth or sixth day he developed herpes zoster, and the other subjective symptoms vanished.

Case 3.—A midwife, aged 70, sent for me to see a rash on her side. While she was so arranging her clothing that I might see it she was seized with a violent epileptic attack—the first and only one that she has ever had. She is alive now, aged 84. The rash was herpes zoster.

These cases suggest to me that there were in these three cases some lesion of the central nervous system, higher up than the cord.

BRUSHING THE TEETH.

DR. F. TALBOT (London, N.) writes: In reply to Dr. Dobell's interesting inquiry, my experience would lead me to reply that he is undoubtedly right in supposing that a rough and unintelligent use of the toothbrush, especially when assisted by a coarse or highly abrasive powder, is capable of injuring and causing the absorption of the slender gum margin. Such cases occur fairly frequently in dental practice, and caries occasionally attacks the cementum where it has been thus deprived of its protection. But the number of such cases bears no comparison at all with the vast number of those which show the terribly destructive effects of unsuitable diet and the neglect of the toothbrush combined. By unsuitable diet is meant in this connexion soft non-fibrous food composed largely of highly fermentable carbohydrates, a diet which fails to keep the masticatory muscles, including the tongue, in good tone: fails to afford the necessary stimulus to the salivary glands which a crisp diet supplies, and leaves the teeth after a meal coated, especially in their crevices and about their necks, with foul tartar and acid-fermenting food débris. These horrors can be mitigated by the systematic use of the toothbrush and rinsing (shall I venture to add a recommendation of the use of chewing gum?); and, until we have mastered the secret of the art of being able to rise from the table with a "physiological mouth," I am sure we shall be well advised not to discard our humble and comparatively innocent friend the domestic toothbrush; least of all can this be done with impunity in childhood, when diet is, as a rule, so prevailingly carbohydrate and immunity so seldom established.

ANTELOPE FLESH AS A CURE FOR SYPHILIS.

DR. GEORGE PERNET writes: In the *Mercure de France* for August 16th (p. 708) some remarks are quoted by M. A. Van Gennep in the course of an article, "En Algérie," which are perhaps worth referring to in the JOURNAL. They relate to antelope flesh as a "cure" for syphilis, and are as follows: "C'est sûrement un dur métier (celui de chasseur de gazelle et d'antilope), et fort peu remunérateur. Mon guide, en dix-huit jours de marche éreintante a réussi une fois à gagner environ cinquante sous (c'est un maximum!) que lui rapporte la viande des antilopes qu'il avait abattues à bien des centaines de kilomètres de là. Ce n'est pas pour la manger qu'on achète la chair de l'antilope, c'est comme un remède contre la syphilis. Quant à la viande de gazelle, on ne la vend ni ne l'achète; elle n'a aucune valeur marchande. Le chasseur la donne à qui bon lui semble, et ce n'est que quand il a de la viande d'antilope à vendre à des syphilitiques ou de la viande de gazelle à donner à ses apparentés ou aux nobles et sheikhs de sa tribu, friands de nourritures carnées, qu'on lui fait bon visage." Among the curious alleged cures for syphilis this one is not generally known.

SECTION OF CLIMATOLOGY AND BALNEOLOGY.

IN the discussion on sea bathing in the Section of Climatology and Balneology at Brighton, a report of which was published in the JOURNAL of August 30th, Dr. Clippingdale is made to say (p. 541, right hand column, line 5 from bottom) that the ancients occasionally mixed sea water with their *urine.* This is obviously a trick of that frolic sprite, the printer's devil. The word should have been *wine.*

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